COUNTY OF LOS ANGELES
Public Health

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PUBLIC HEALTH RECOMMENDATIONS TO MINIMIZE THE HEALTH EFFECTS OF AIR POLLUTION ASSOCIATED WITH DEVELOPMENT NEAR FREEWAYS AND HIGH-VOLUME ROADS

This document is intended for developers, planners, government officials and others working on development within Los Angeles County. It provides an overview of health effects associated with proximity to sources of traffic pollution and includes several sets of recommendations regarding land use near freeways and high-volume roadways, as well as an overview of best practice mitigation measures for development at sites within 1500 feet of a freeway or high-volume roadway.

Development of new schools, housing, and other sensitive land-uses in proximity to freeways

Studies indicate that residing near sources of traffic pollution is associated with adverse health effects, including development of asthma in children, more severe symptoms among those with asthma, non-asthma respiratory symptoms, impaired lung function, reduced lung development during childhood, and cardiovascular disease morbidity and mortality.[1] These associations are diminished with distance from the pollution source. Additionally, emerging research suggests a possible link between autism and prior exposure to air pollution during the prenatal period.[2]

Some individuals (known as "sensitive receptors") are more susceptible to adverse health effects from traffic pollution due to their age and/or health status. The South Coast Air Quality Management District (SCAQMD) advises that the following land uses are sites where sensitive receptors are typically located: residences; schools, playgrounds and childcare sites; hospitals; long-term health care facilities; rehabilitation centers; convalescent centers; and retirement homes.

Given the association between traffic pollution and health, the California Air Resources Board (CARB) recommended in its 2005 Air Quality and Land Use Handbook that residences, schools, and other sensitive land uses be sited at least 500 feet from freeways.[3] While new technology and stricter standards are supporting efforts to decrease harms from vehicle emissions, in a 2017 technical advisory, CARB reiterated that studies continue to show high air pollution concentrations near roadways are linked to serious health impacts.[4] The 2017 CARB publication also highlighted the possibility that near-roadway pollution exposure had previously been underestimated, and that people living as far as 1,000 feet from freeways are susceptible to the effects of traffic pollution. Other reputable research entities such as the Health Effects Institute (HEI) indicate that exposure to unsafe levels of traffic emissions may in fact occur up to 984 to 1640 feet (300 to 500 meters). The range reported by HEI reflects the variable influence of background pollution concentrations, meteorological conditions, and season.[5]

Based on this large body of scientific evidence, the Los Angeles County Department of Public Health (DPH) recommends:

- A buffer of at least 500 feet should be maintained between the development of new schools, housing or other sensitive land uses and freeways. Consideration should be given to extending this minimum buffer zone based on site-specific conditions, given the fact that unsafe traffic emissions may be present at greater distances. *

- New schools, housing or other sensitive land uses built between 500 and 1500 feet of a freeway should adhere to current best-practice mitigation measures to reduce exposure to air pollution which may include: the use of regularly maintained air filtration to enhance heating, ventilation and air conditioning (HVAC) systems, and the orientation of site buildings and placement of outdoor facilities designed for moderate to vigorous physical activity as far from the emission source as possible.[6]

Development of parks and active recreational facilities in proximity to freeways

Parks and recreational facilities provide important health benefits to community residents by increasing opportunities for physical activity, improving mental health, and strengthening social ties with neighbors.[7,8,9] However, siting parks and active recreational facilities near freeways may increase public exposure to harmful pollutants, particularly while exercising. Studies show that heavy exercise near sources of traffic pollution may have adverse health effects.[10,11,12] However, there are also substantial health benefits associated with exercise.[13] Therefore, DPH recommends the following cautionary approach when siting parks and active recreational facilities near freeways:

- New parks with athletic fields, courts, and other outdoor facilities designed for moderate to vigorous physical activity, should be sited at least 500 feet from a freeway. Consideration should be given to extending this minimum buffer zone based on site-specific conditions given that unhealthy traffic emissions are often present at greater distances.

- New parks built between 500 and 1500 feet of freeways should adhere to best-practice mitigation measures that minimize exposure to air pollution. These include the placement of athletic fields, courts, and other active outdoor facilities as far as possible from the air pollution source.

Development in proximity to high-volume roads (excluding freeways)

CARB defines high-volume roads as those carrying traffic in excess of 50,000 vehicles on an average day in a rural area and 100,000 vehicles on an average day in an urban area. Air emissions near high-volume roads can be similar to freeway-adjacent emissions, and CARB recommends a similar buffer distance (500 feet minimum) be established to separate sensitive uses from high-volume roads to protect health.[14] In addition to overall road volume, CARB guidance states that truck traffic density is a key factor that contributes to air quality near roadways due to the diesel particulate matter (PM) that they generate. Trucks that transport perishable goods contribute additional emissions from diesel powered transport refrigeration units (TRUs).[15] Given that high-volume roadways exist throughout Los Angeles County, DPH recommends the following approach:

- New schools, housing or other sensitive land uses built within 500 feet of a high-volume roadway should adhere to current best-practice mitigation measures and be sited as far from the roadway as possible.

- New parks and recreational facilities built within 500 feet of a high-volume roadway should adhere to current best-practice mitigation measures and be sited as far from the roadway as possible.

- Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating TRUs per day, or where TRU unit operations exceed 300 hours per week).

Additional Considerations

Many communities in Los Angeles County that are located near freeways and high-volume roads are also characterized by compact and walkable development that offers a mix of uses and easy access to transit, employment centers, retail, and other amenities. This type of development pattern is recognized by CARB and other expert bodies as a key strategy in improving regional air quality by replacing driving trips with walking, bicycling, and transit trips.[16,17] Walking and bicycling are also important ways to increase physical activity and reduce chronic diseases such as diabetes and cardiovascular disease. Promoting development in existing city centers and other built-up areas can also help address needs for affordable housing near places of work, reduce development pressure on outlying areas, and help in efforts to protect natural areas. DPH recognizes both the benefits of such development patterns and the need for affordable housing in city centers and maintains that due to the potential health risks, particularly for low income populations already experiencing significant health inequities, sensitive land uses should be located at least 500 feet from freeways.

Best Practice Mitigation Measures to Reduce Exposure to Road Pollution

Research has shown a clear association between exposure to near road air pollution and negative health outcomes, leading DPH to recommend that a 500-foot buffer should be maintained between the development of new schools, housing and other sensitive use and freeways. DPH also recommends that any development in proximity to freeways and high-volume roads should adhere to current best-practice mitigation measures to reduce exposure to air pollution. There is limited information about the effectiveness of measures designed to reduce exposures and mitigate negative health effects. However, if a jurisdiction decides to proceed with development near freeways or high-volume roadways, DPH offers the following considerations, consistent with CARB's Technical Advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways. April 2017.* It is important to note that no single mitigation measure alone has been identified as adequate to reduce the entry of pollutants into residences from nearby roadways. Rather, it is the combination of mitigation measures that is likely to have the greatest impact on reducing air pollutants in indoor air. Note that adhering to fire code takes precedence over these considerations.

1. Building design measures:
    a. Site apartment units as far as possible from the source of air pollution.
    b. Double glaze all windows in the housing units to reduce exposure to air pollution.
    c. Avoid or limit the placement of balconies on the side of the building facing the freeway/high volume roadway.
    d. Install MERV 13 filters (or above) on the air handling units for the HVAC system and replace them on a quarterly basis or whatever basis is recommended by the filter/HVAC system manufacturer. Identify who will replace the MERV filters, ensure that personnel are trained on their responsibilities, and conduct regular inspections to ensure that filters are being replaced as recommended.
    e. Locate outdoor air intakes for the HVAC system as far as possible from the freeway/roadway, the freeway off-ramp, and the parking area.
    f. Maximize the sound transmission co-efficient (STC) for the interior/exterior walls to limit indoor noise and air pollution.
    g. Design buildings with varying shapes and heights to help break up air pollution emission plumes, increase air flow, and help reduce pollutants such as particulates and noise.

2. Site-related measures:
    a. Where possible, erect a sound wall between the development and the freeway to help serve as a noise and air pollution barrier.
    b. Plant vegetation barriers between the freeway/high volume roadway and the housing site to help with pollution reduction. In selecting the design and species for this vegetation barrier, follow guidance described in the Environmental Protection Agency's July 2016 document "*Recommendations for Constructing Roadside Vegetation Barriers to Improve Near-Road Air Quality*". To assist in identifying appropriate trees, see the following link: www.itreetools.org
    c. Plant additional trees on neighborhood streets surrounding the housing development to further mitigate air pollution.

3. Transportation measures:
    a. To reduce idling, traffic build-up, and associated emissions, install roundabouts at freeway off-ramps and at intersections near the site.
    b. Encourage occupants to use zero-emission vehicles by providing preferential parking for these vehicles and by providing charging stations.
    c. Provide bicycle parking and parking spaces for car-sharing programs.

* Conditions along a freeway and on different freeways are subject to considerable variation. Vehicle types on the roadway (diesel, gas, electric, or hybrid vehicles), average speeds, average daily traffic volumes and other factors all impact the levels of pollution generated by a freeway, and thus the necessary buffer zone to reduce health risks

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