Traffic, Development & Neighborhood Quality of Life

The information in the next few pages (1-5) is taken primarily from Community & Environmental Defense Services.org and includes various excerpts from their website. I have also included information and charts from the Institute for Transportation Engineers Journal.

Some car, truck, and bus traffic on neighborhood streets is a necessity given our current life style. However, this does not mean that these streets must accommodate an ever increasing amount of traffic. In fact, growth and traffic management agencies have an obligation to prevent traffic from reaching the point where it lowers quality of life or threatens public health and safety. Unfortunately, these agencies vary considerably across the nation with regard to their effectiveness in meeting this obligation. But this variation is due more to the amount of public support they receive and attitudes of elected officials.

Fortunately, citizen advocates have had great success in expanding public support, then getting responsible growth management candidates elected which translates into far more effective traffic management. This webpage is designed to show how you can accomplish the same whether you're dealing with an individual development proposal or traffic issues throughout a town, city or county.

If you're concerned about how growth may affect traffic congestion and safety anywhere in the USA then contact CEDS at 410-654-3021 (call-text) or Help@ceds.org for an initial no-cost discussion of strategy options. Please don't hesitate. Delay almost always decreases the likelihood of success.
Community & Environmental Defense Services.org https://ceds.org/traffic/#cut

How Much Traffic Is Too Much?

The Federal Highway Administration has adopted the following roadway classification system. With arterials, collectors and larger local streets congestion limits traffic volume; usually in excess of 1,500 vehicles per lane during the peak hour or 15,000 vehicles per day (vpd). With local streets, particularly those classified as secondary local or neighborhood streets, safety and other quality of life impacts should set volume limits. Most localities will not consider physical traffic calming measures until traffic volume exceeds 1,000 vpd. It appears that 4,000 vpd may be approaching the point where physical measures alone are not sufficient to preserve quality of life along a neighborhood street. Above 4,000 vpd traffic planners and engineers look at options for modifying road networks to limit travel on the neighborhood street. Other factors can lower the acceptable traffic volume level such as the absence of sidewalks and proximity to elementary schools.

While every through-street will carry traffic from one main road to another, neighborhood quality of life suffers when the volume crosses a certain threshold.

Where is that threshold?

The table below is from a paper that appeared in the Institute for Transportation Engineers Journal. The term “environment” in the table is defined as:
“one where residents can live, work and move about in freedom from the hazards of motor traffic.”

Environment	Vehicles Per Minute	Vehicles Per Day
Excellent	0.5	300
Good	0.5-1.0	300-600
Acceptable	1.0-2.0	600-1200
Poor	>2.0	>1200

To put these numbers in perspective, each single-family detached home generates one peak-hour trip and ten trips per day. This includes not just the cars and SUVs driven by residents but delivery trucks and all other traffic entering-exiting a neighborhood. One would anticipate that those who live on a residential street prefer that traffic volume remain in the good to excellent range or **less than 600** vehicles per day. In other words, land use decisions should not cause traffic volume to exceed 600 vehicles per day on a neighborhood street.

Please see page 10 - Ventura Police Dept data showing Poli Street traffic exceeding 8,000 cars per day.

Pedestrian & Cyclist Safety

In 2013, 4,735 pedestrians were killed in the U.S. by automobiles and 55% of these fatalities occurred on neighborhood streets. For every pedestrian killed by a car, another 15 were injured. Speed is a major factor determining whether a pedestrian will be killed or injured by an automobile. **A pedestrian is nine times more likely to die if struck by a car traveling at 30 mph compared to 20 mph. Other factors contributing to the high pedestrian accident rate on neighborhood streets include lack of adequate sidewalks, bike lanes, and crossings.**

Please note that in the Ventura Police report "Enforceable Violations" only include speeds above 35 mph (page 10). The raw data shows that 72% of traffic passing Poli & Live Oak is in excess of the posted speed limit of 25 mph. With 72% of traffic at a speed that can potentially kill a pedestrian, we have a problem...

Air Quality & Health

A typical U.S. car emits enough pollution to create five tons of carbon dioxide a year. Cars and trucks produce half of all toxic air pollution emitted in the U.S. Estimates indicate that air pollution from cars results in 120,000 premature deaths each year in the U.S. Traffic generated air pollution also accounts for $40-$50 billion in health care costs each year in this country. In addition to these regional issues, some proposed development projects can create localized air quality problems. There is some evidence indicating that those living within 600 feet of a major highway may be particularly at risk due air pollution.

Please see Pages 6 - 9 on Health Impacts due to Traffic.

Noise, Health & Property Value

Traffic noise can interfere with sleep, conversation, and other neighborhood pursuits. About 9.5% of us are exposed to traffic noise at a level which affects health.
Sound becomes noise when it interferes with our quality of life. Sound is measured in units known as decibels (dB) and highway noise is measured on an "A-weighted decibel" (dBA) scale. 70 dBA is eight times as loud as 60 dBA. The noise level in a library might be 30 dBA while an air conditioner would emit 60 dBA.
Traffic noise can have a significant effect on property value. A home located adjacent to a major highway may sell for 8% to 10% less when compared to one located along a quiet neighborhood street. Heavy truck traffic lowers property value at a rate 150 times greater than cars. An increase in heavy truck traffic may also cause damage to nearby homes through vibrations transmitted through the earth.
The best way to prevent traffic from causing a property value loss is to keep traffic volume low and, most importantly, avoid the use of a neighborhood street by heavy trucks, like dump trucks as opposed to parcel delivery vans.

Accidents

The six most common causes of vehicle accidents are: distraction, fatigue, being under the influence, speeding, aggressive driving and weather. **However, poorly planned growth can exacerbate accident rates by increasing congestion, which tends to cause some drivers to speed up and take more risks.**
Cut through and diverted traffic can cause neighborhood volume to increase many fold along with an increase in average vehicle speed, the result of which is an increase in both vehicle, pedestrian and cyclist accidents.

Please page 12 - Ventura Police report on local accident rates in Midtown.

Neighborhood Traffic Calming

As the title implies, the goal of calming measures is to reduce the speed and volume of traffic on neighborhood streets. Many local and state governments have instituted programs to employ these measures, particularly on streets dominated by homes and carrying a high volume of cut-through traffic. Perhaps the most familiar example of a traffic calming measure is the speed hump, which can reduce average vehicle speed to 25 miles per hour or less.
The folks who tend to be most concerned about the traffic impact of a development proposal are those currently suffering from excessive traffic. Calming measures can be used to resolve the existing problem.
As stated above, conventional traffic impact analyses focus on congestion, not neighborhood street safety. Traffic congestion may not become an issue until traffic volume exceeds 15,000 vehicles per day (vpd) whereas **neighborhood street safety concerns begin around 1,000 vpd and may become unmanageable at 4,000 vpd.** This may provide you with an argument to convince a decision-making body not to allow a project to add traffic to your street if it causes volume to exceed the effective limits of calming measures.

Please see page 10 - Ventura Police Dept data showing Poli Street traffic exceeding 8,000 cars per day.

Traffic Calming Measures

As the phrase implies, *traffic calming* is intend to reduce both volume and speed. It is applied to neighborhood streets as well as downtown shopping areas with high volumes of pedestrian activity. Generally it consists of three approaches: education, structures and enforcement. Speed humps are the most recognizable form of traffic calming. Traffic calming measures can reduce accident rates by 15% to 20% on residential streets.
Speed humps and other structures tend to be most effective. **Education such as signs that flash your speed do reduce speed at first but the effect tends to diminish after a couple of weeks.** Speed traps and other enforcement approaches are certainly effective but, again, the benefits dwindle over time. Even stop signs are viewed as relatively ineffective on low-volume roads where drivers routinely roll through. Structures such as speed humps slow traffic to 25 mph or less permanently. They cost about $6,000 each and are usually spaced 300- to 600-feet apart. However, it is claimed that fire departments tend to object to speed humps since they slow response time to emergencies.

The goal of these measures is first to slow traffic speed then reduce excessive traffic volume. Both actions cause neighborhood streets to be safer to cross and less hazardous for residents.

Effectiveness of Neighborhood Traffic Management Techniques

This table appeared as Table 5 in Comprehensive Engineering Approach to Achieving Safe Neighborhoods

Category	Technique	Primary Measure of Effectiveness	Percent Reduction In…		
			Volume	Speed	Collisions
Route Modification Devices	Full closures (1 to 4 blocks away)	Volume reduction	44%		
	Half closures (1 to 4 blocks away)	Volume reduction	42%	19%	
	Diagonal diverters	Volume reduction	35%	4%	
Traffic Calming Devices	Speed humps	Speed reduction	18% to 22%	23%	13% to 40%
	Speed tables	Speed reduction	12%	18%	45%
	Raised intersections	Speed reduction		1%	
	Traffic circles	Speed reduction	5%	11%	28%
	Roadway narrowing	Volume reduction	10%	4%	
	Chokers	Volume reduction	20%	14%	
Regulatory Measures	Speed trailers	Speed reduction	9%	7%	10%
	Speed limit signs and markings	Speed reduction	4%	7%	3%
	Increased enforcement	Speed reduction	8%	28%	28%

https://i0.wp.com/ceds.org/wp-content/uploads/2019/05/calming.jpg?resize=1200%2C652&ssl=1

Traffic Count Accuracy

An accurate count of traffic volume is key. As such counts are central to the Traffic Impact Studies covered in the next section of this webpage. Traffic counts are best done with counters. When you see rubber tubes stretched across a road you're seeing a traffic count underway. Counts are usually made for 48 hours during those times of the week and year when traffic volume tends to be highest. The 48 hours of data is then analyzed to determine the one-hour period with the highest traffic volume in the morning and evening. Usually the weekday peak-hour occurs between 7:00 – 9:00 am and 4:00 – 6:00 pm. Counts should be made in good weather on a school day. Never on a holiday. Generally Tuesday to Thursday is best. But you do not need an expensive counter to determine traffic volume. Except for the highest volume roads you can do counts manually. Procedures for doing your own traffic count can be found at: CEDS Traffic Evaluation Procedures. And our clients have won a number of cases by showing that the applicant's counts were well below actual traffic volumes.

Traffic Impact Studies

Most local and state traffic-highway agencies will require a traffic impact study (TIS) for medium to large projects. A common threshold for a residential TIS is 50 homes or more. Your local traffic agency or state highway agency may have published minimum standards for traffic impact studies. A number of intersection congestion issues can be resolved by adding a new turn lane or by adjusting signal timing. Unfortunately it pretty much takes a professional traffic engineer to evaluate the accuracy of a TIS. For simplified methods to assess traffic study accuracy see: CEDS Traffic Evaluation Procedures.

Health Impacts from Proximity to Traffic

Residential proximity to motor vehicle traffic is associated with increased exposures to ambient noise, toxic gases and particulate matter, including diesel particulates. Based on the available evidence, residential proximity at a distance of roughly 100–300 meters is related to poorer health outcomes.[1,2] This proximity to traffic has been associated with various health impacts for residents, particularly asthma exacerbation and possibly onset of asthma, as well as increased mortality rates.[3,4] Living in proximity to traffic has also been associated with subclinical atherosclerosis (a key pathology underlying cardiovascular disease (CVD)), prevalence of CVD and coronary heart disease (CHD), incidence of myocardial infarction, and CVD mortality.[5] Proximity to traffic can also mean increased noise exposure, which is linked to stress and poorer health outcomes.[6]

https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/physical-environment/housing-transit/traffic-volume

Residential Exposure to Traffic Is Associated With Coronary Atherosclerosis

B. Hoffmann,S. Moebus,S. Möhlenkamp,A. Stang,N. Lehmann,N. Dragano ,M. Memmesheimer,K. Mann,R. Erbel,K.-H. Jöckel and for the Heinz Nixdorf Recall Study Investigative Group

Originally published16 Jul 2007 https://doi.org/10.1161/CIRCULATIONAHA.107.693622Circulation. 2007;116:489–496

Abstract

Background— Long-term exposure to fine-particulate-matter ($PM_{2.5}$) air pollution may accelerate the development and progression of atherosclerosis. We investigated the associations of long-term residential exposure to traffic and fine particulate matter with the degree of coronary atherosclerosis.
Methods and Results— We used baseline data on 4494 participants (age 45 to 74 years) from the German Heinz Nixdorf Recall Study, a population-based, prospective cohort study that started in 2000. To assess exposure differences, distances between residences and major roads were calculated, and annual fine particulate matter concentrations, derived from a small-scale dispersion model, were assigned to each address. The main outcome was coronary artery calcification (CAC) assessed by electron-beam computed tomography. We evaluated the association between air pollution and CAC with logistic and linear regression analyses, controlling for individual level risk factors of coronary atherosclerosis. Compared with participants living >200 m away from a major road, participants living within 50, 51 to 100, and 101 to 200 m had odds ratios of 1.63 (95% CI, 1.14 to 2.33), 1.34 (95% CI, 1.00 to 1.79), and 1.08 (95% CI, 0.85 to 1.39), respectively, for a high CAC (CAC above the age- and gender-specific 75th percentile). A reduction in the distance between the residence and a major road by half was associated with a 7.0% (95% CI, 0.1 to 14.4) higher CAC. Fine particulate matter exposure was associated with CAC only in subjects who had not been working full-time for at least 5 years.

Conclusions—
Long-term residential exposure to high traffic is associated with the degree of coronary atherosclerosis.

Road traffic noise and incident myocardial infarction: a prospective cohort study

Mette Sørensen[1], Zorana J Andersen, Rikke B Nordsborg, Steen S Jensen, Kenneth G Lillelund, Rob Beelen, Erik B Schmidt, Anne Tjønneland, Kim Overvad, Ole Raaschou-Nielsen

Abstract: Both road traffic noise and ambient air pollution have been associated with risk for ischemic heart disease, but only few inconsistent studies include both exposures.
Methods: In a population-based cohort of 57 053 people aged 50 to 64 years at enrolment in 1993-1997, we identified 1600 cases of first-ever MI between enrolment and 2006. The mean follow-up time was 9.8 years. Exposure to road traffic noise and air pollution from 1988 to 2006 was estimated for all cohort members from residential address history. Associations between exposure to road traffic noise and incident MI were analysed in a Cox regression model with adjustment for air pollution (NO(x)) and other potential confounders: age, sex, education, lifestyle confounders, railway and airport noise.
Results: We found that residential exposure to road traffic noise (L(den)) was significantly associated with MI, with an incidence rate ratio IRR of 1.12 per 10 dB for both of the two exposure windows: yearly exposure at the time of diagnosis (95% confidence interval (CI): 1.02-1.22) and 5-years time-weighted mean (95% CI: 1.02-1.23) preceding the diagnosis. Visualizing of the results using restricted cubic splines showed a linear dose-response relationship.

Conclusions: Exposure to long-term residential road traffic noise was associated with a higher risk for MI, in a dose-dependent manner.

Long-term effects of traffic-related air pollution on mortality in a Dutch cohort (NLCS-AIR study)

Rob Beelen[1], Gerard Hoek, Piet A van den Brandt, R Alexandra Goldbohm, Paul Fischer, Leo J Schouten, Michael Jerrett, Edward Hughes, Ben Armstrong, Bert Brunekreef

Abstract
Background: Several studies have found an effect on mortality of between-city contrasts in long-term exposure to air pollution. The effect of within-city contrasts is still poorly understood.
Objectives: We studied the association between long-term exposure to traffic-related air pollution and mortality in a Dutch cohort.
Methods: We used data from an ongoing cohort study on diet and cancer with 120,852 subjects who were followed from 1987 to 1996. Exposure to black smoke (BS), nitrogen dioxide, sulfur dioxide, and particulate matter < or = 2.5 microm (PM(2.5)), as well as various exposure variables related to traffic, were estimated at the home address. We conducted Cox analyses in the full cohort adjusting for age, sex, smoking, and area-level socioeconomic status.
Results: Traffic intensity on the nearest road was independently associated with mortality. Relative risks (95% confidence intervals) for a 10-microg/m(3) increase in BS concentrations (difference between 5th and 95th percentile) were 1.05 (1.00-1.11) for natural cause, 1.04 (0.95-1.13) for cardiovascular, 1.22 (0.99-1.50) for respiratory, 1.03 (0.88-1.20) for lung cancer, and 1.04 (0.97-1.12) for mortality other than cardiovascular, respiratory, or lung cancer. Results were similar for NO(2) and PM(2.5), but no associations were found for SO(2).

Conclusions: Traffic-related air pollution and several traffic exposure variables were associated with mortality in the full cohort. Relative risks were generally small. Associations between natural-cause and respiratory mortality were statistically significant for NO(2) and BS. These results add to the evidence that long-term exposure to ambient air pollution is associated with increased mortality.

Living near a major road increases the likelihood of developing a neurological disorder such as Alzheimer's, Parkinson's and multiple sclerosis (MS) according to research published in the journal *Environmental Health.* https://ehjournal.biomedcentral.com/articles/10.1186/s12940-020-0565-4

There is little known about the air quality risk factors associated with these disorders, so researchers at the University of British Columbia set out to investigate the link between them and air pollution.

The researchers analysed data from 678,000 adults between the ages of 45 – 84 who lived in Vancouver between 1994 to 1998 and estimated individual exposure to road proximity, air pollution, noise and green space, based on each person's postcode.

During the follow-up period, the researchers identified 13,170 cases of dementia, 4,201 cases of Parkinson's and 658 cases of MS.

Based on this, the researchers found that living less than 50 metres from a major road or less than 150 metres from a motorway is associated with a 14% increased risk in developing dementia, Parkinsons, Alzheimers and MS due to the increased exposure to air pollution.

When the researchers analysed proximity to green space, they found that the effect of air pollution on neurological disorders was reduced, which suggests that living near green spaces can have a protective effect.

Air pollution is known to trigger neuroinflammation which is the immune response of the brain to fight an invasion of toxins. It can become over-active and cause damage to healthy tissue, which can consequently lead to neurological damage.

Other Key Studies

1. Health Effects Institute Panel on the Health Effects of Traffic-Related Air Pollution, Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects. Health Effects Institute: Boston, 2010. Available at www.healtheffects.org.
2. Andersen ZJ, Hvidberg M, Jensen SS, Ketzel M, Loft S, Sørensen M, Tjønneland A, Overvad K, and Raaschou-Nielsen O. Chronic Obstructive Pulmonary Disease and Long-Term Exposure to Traffic-related Air Pollution: A Cohort Study. Am J Respir Crit Care Med. 2011; 183: 455-461.
3. Finkelstein MM, Jerrett M., Sears M.R. Traffic Air Pollution and Mortality Rate Advancement Periods. Am J Epidemiol. 2004; 160: 173-177; Hoek G, Brunkreef B, Goldbohn S, Fischer P, van den Brandt. Associations between mortality and indicators of traffic-related air pollution in the Netherlands: a cohort study. Lancet. 2002; 360: 1203-1209.
4. Peters A, von Klot S, Heier M, Trentinaglia I, Cyrys J, Hormann A, Hauptmann M, Wichmann HE, Lowel H. Exposure to Traffic and the Onset of Myocardial Infarction. N Engl J Med. 2004; 351: 1721-1730.

(Continued)

5. Suglia SF, Gryparis A, Schwartz J, and Wright RJ. Association between Traffic-Related Black Carbon Exposure and Lung Function among Urban Women. Environ Health Perspect. 2008;116 (10): 1333-1337.
6. Chen H, KJC, Capes R, et al. Living near major roads and the incidence of dementia, Parkinson's disease and multiple sclerosis: a population-based cohort study. Lancet. 2017. Published online http://dx.doi.org/10.1016/5014-6736(16)32596-X.
7. Power MC, Weisskopf MG, Alexeeff SE, et al,. Traffic-related air pollution and cognitive function in a cohort of older men. Environ Health Perspect 2011;119:682–687. doi:10.1289/ehp.1002767
Page last updated: January 5, 2021

https://www.lung.org › clean-air › outdoors › who-is-at-risk

A study on residents of Ontario found that rates of dementia increased the closer you lived to a major road all the way out to 300 m, and was highest among people who lived near a major road, in an urban area, and lived there for an extended period.
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2816%2932399-6/fulltext

A study on older women found that COPD was much more common among women living <100 m from a major road than women living >100 m from a major road.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1352358/

A study on children in California found that growing up within 500 m of a major road had significant detrimental effects on lung development.
https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736%2807%2960037-3.pdf

A study on children in California found that they were more likely to develop autism if their mothers lived within 1000 feet of a freeway during the third trimester.
https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1002835

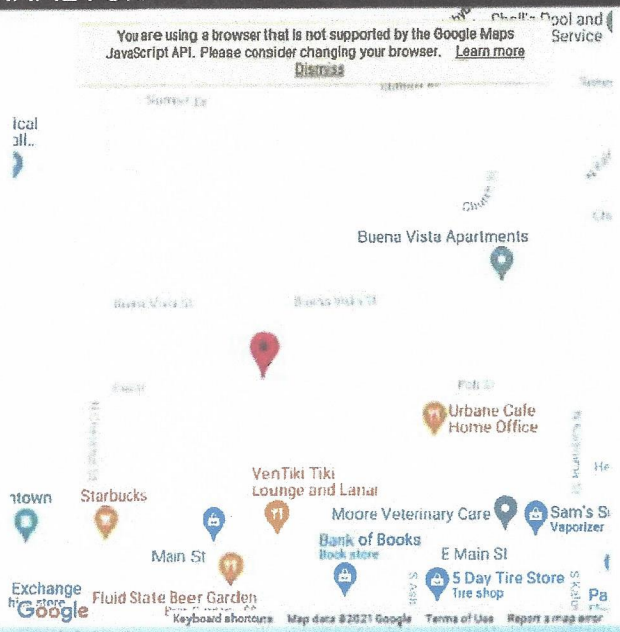
A study on older women found that proximity to a major roadway was highly correlated with prevalence of hypertension:
https://www.ahajournals.org/doi/full/10.1161/JAHA.113.000727

Default Report Title
Use Preferences to Define Titles

SPEED DATA ANALYSIS

Location

Poli and Fir
Latitude: 34.282164
Longitude: -119.289942



Analysis Time Period

Start	End
11/4/2021 12:21 PM	11/8/2021 3:05 PM

(4 DAYS)

Vehicles Analyzed

32,390

Speed Limit

25

Total Enforceable Violations

124

Average Speed

27

Fastest Speed

65

Slowest Speed

7

85th Percentile Speed

31

Enforcement Rating

LOW

Default Report Title
Use Preferences to Define Titles

SPEED DATA ANALYSIS

Location

Foothill Rd
Willowick Dr
Latitude: 34.282417
Longitude: -119.246248

Analysis Time Period

Start	End
8/5/2021	8/9/2021
12:47 PM	11:04 AM

(4 DAYS)

Vehicles Analyzed

29,242

Speed Limit

40

Total Enforceable Violations

327

Average Speed

43

% Enforceable Violations

1%

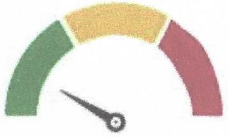
Fastest Speed

80

Enforcement Rating

LOW

Slowest Speed



7

VENTURA POLICE DEPARTMENT