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Subject: Comments on the air quality analysis done for the 2012 Draft Supplemental Environmental Impact Report for the 2012 Draft Marin County Housing Element

Dear Ms. Koss:

Thank you for asking me to review and comment on the air quality analysis done for the *2012 Draft Supplemental Environmental Impact Report for the 2012 Draft Marin County Housing Element* (DSEIR). As a consultant in environmental air quality and acoustics, I have more than 20 years of experience in the preparation and review of environmental technical reports for a wide variety of commercial, transportation, and urban development projects in California. I include at the end of this letter a more complete resume of my qualifications and experience in this field for your consideration.

Since the late 1990s, research studies have increasingly and consistently shown an association between respiratory and other health effects and the proximity of sensitive populations to high-traffic roadways where cars and trucks emit toxic air contaminants (TACs) in large quantities over extended periods of time; diesel exhaust, in particular, has been found to be responsible for much of the overall cancer risk from TACs in California. Other TACs emitted by mobile and stationary sources also contribute substantially to the health burden (e.g., perchloroethylene, a solvent most commonly used by dry cleaners, has been identified as a potential cancer-causing compound). Among the pioneering studies that have led to an increasing focus on TAC exposure abatement in statewide air quality improvement programs are the following:

- Brunekreef, B. et al. *Air pollution from truck traffic and lung function in children living near motorways*. Epidemiology. 1997; 8:298-303
- Lin, S. et al. *Childhood asthma hospitalization and residential exposure to state route traffic*. Environ Res. 2002;88:73-81
- Venn et al*. Living near a main road and the risk of wheezing illness in children*. American Journal of Respiratory and Critical Care Medicine. 2001; Vol.164, pp. 2177-2180

- Kim, J. et al. *Traffic-related air pollution and respiratory health: East Bay Children's Respiratory Health Study*. American Journal of Respiratory and Critical Care Medicine 2004; Vol. 170. pp. 520-526

These findings and others were taken under consideration by the California Air Resources Board (CARB) in developing the *Air Quality and Land Use Handbook: A Community Health Perspective* (April 2005). In this document, the CARB made recommendations for consideration by local planning agencies when siting new residences and other sensitive uses (i.e., schools, day care centers, playgrounds, and medical facilities, etc.). These sensitive land uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to air pollutants.

Research in the field of TAC exposures and health outcomes has increased since the CARB *Handbook* was issued and the findings have confirmed earlier results and identified new adverse health effects that significantly correlate with TAC exposures. A recent cursory search of the National Center for Biotechnology Information's PubMed database brought up the following sample of research papers that continue to raise and deepen concerns about TACs (abstracts for these are attached; many other similar papers issued since the *Marin Countywide Plan* was adopted in 2007 can easily be found by a more extensive PubMed search):

- Patel, MM et al. *Traffic-related air pollutants and exhaled markers of airway inflammation and oxidative stress in New York City adolescents*. Environ Res. 2012 Nov 22
- Dadvand, P et al. *Maternal Exposure to Particulate Air Pollution and Term Birth Weight: A Multi-Country Evaluation of Effect and Heterogeneity*. Environ Health Perspect. 2012 Feb 6.
- Brunekreef, B et al. *Effects of long-term exposure to traffic-related air pollution on respiratory and cardiovascular mortality in the Netherlands: the NLCS-AIR study*. Res Rep Health Eff Inst. 2009 Mar.
- Padula, AM et al, *Exposure to traffic-related air pollution during pregnancy and term low birth weight: estimation of causal associations in a semiparametric model*. Am J Epidemiol. 2012 Nov.
- Gan, WQ at el. *Associations of Ambient Air Pollution with Chronic Obstructive Pulmonary Disease Hospitalization and Mortality*. Am J Respir Crit Care Med. 2013 Feb 7.
- Yackerson, NS et al. *The influence of air-suspended particulate concentration on the incidence of suicide attempts and exacerbation of schizophrenia*. Int J Biometeorol. 2013 Jan 16.
- Faustini, A et al. *Air pollution and multiple acute respiratory outcomes*. Eur Respir J. 2013 Jan 11.
- Zora, JE et al. *Associations between urban air pollution and pediatric asthma control in El Paso, Texas*. Sci Total Environ. 2013 Jan 8.
- Willers, SM et al. *Fine and coarse particulate air pollution in relation to respiratory health in Sweden*. Eur Respir J. 2013 Jan 11.
- Lewis, TC et al. *Air pollution and respiratory symptoms among children with asthma: Vulnerability by corticosteroid use and residence area*. Sci Total Environ. 2012 Dec 26.

Locally, the Bay Area Air Quality Management District (BAAQMD) has made TACs a centerpiece of its air quality planning efforts. The Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to TACs in the Bay Area. And more recently, the BAAQMD has revised its TAC assessment methodologies and significant thresholds in its *California Environmental Quality Act Air Quality Guidelines* (May 2011). Of particular use for my review of the DSEIR are the health risk screening tools in the BAAQMD Guidelines that present the major roadway and stationary sources in the Bay Area and allow preliminary conclusions to be drawn about the risks they pose to new sensitive uses proposed

for development nearby, based on recommended significance thresholds for cancer risk, other chronic health effects, and exposure to airborne fine particulate matter ($PM_{2.5}$).

Although the *Marin County Housing Element* identifies 52 sites for residential development, I focused my review of the DSEIR air quality findings on the potential TAC health risks to future residents on the following sites in Tamalpais Valley:

- Site #4 - Old Chevron Station (21 units proposed at 204 Flamingo Road);
- Site #9 - Manzanita Mixed Use (3 units proposed at 150 Shoreline Highway);
- Site #14 - Armstrong Nursery (53 units proposed at 217 & 211 Shoreline Highway);
- Site #18 - Around Manzanita (45 units proposed at 150 Shoreline Highway); and
- Site #19 - Tam Junction Retail (60 units proposed at 237 Shoreline Highway).

In general, the DSEIR air quality analysis references the BAAQMD *Guidelines* TAC screening tools and significance thresholds, but is not very precise in the application of the TAC screening criteria to all sites, nor very clear in identifying sites that would experience significant TAC impacts and all sources responsible, nor very specific about the limitations of its generic mitigation strategies when applied to the specific character of each identified significantly-impacted site. I did an independent health risk screening analysis by applying the BAAQMD exposure levels from roadways and stationary sources within each of the Tamalpais Junction sites' zones of influence (i.e., within 1000 feet of each site boundary) and drew my own conclusions based on estimated TAC levels and their comparisons with BAAQMD significance criteria for cancer risk, non-cancer hazard and $PM_{2.5}$ level.[1]

As shown in Table 1, all of the Tamalpais Junction sites are located within the zone of influence of a number of strong roadway and stationary TAC sources as identified in the BAAQMD's listings. With regard to the Tamalpais Valley sites, the DSEIR identifies Sites #4 and #19 as subject to a potentially significant cancer risk to future residents from TACs emitted from one stationary source, Shoreline Cleaners (DSEIR, pp. 82 - 84, Exhibit 3.0-4.), but the DSEIR does not disclose the severity of this risk. Shoreline Cleaners poses a cancer risk of 73.4, compared to the BAAQMD threshold of 10. In addition, the DSEIR fails to disclose another significant source of TACs, the County of Marin Crest Marin Pump Station Generator, which poses an additional risk of 52.7, also well above the BAAQMD threshold of 10. The DSEIR also fails to report that Site #14 would also be subject to the same potential significant cancer risks from these same two stationary sources, and that all three sites could experience a significant cumulative cancer risk (143.6, compared with the significant cumulative BAAQMD threshold of 100) from collective TAC emissions from all roadway and stationary sources in their zone of influence. Finally, the DSEIR also fails to report that Sites #9 and #18 would also be subject to potential significant cancer risk from TACs emitted by Highway 1 traffic (13.5, compared the BAAQMD threshold of 10) and by the Sausalito Marin City Sanitary District Generator(14.7, compared the BAAQMD threshold of 10).

1 For a less-than-significant project-level TAC impact, a cancer risk should be less than 10 chances of cancer death from a lifetime exposure at the specified TAC concentration, a non-cancer hazard index should be less than 1.0, and an annual $PM_{2.5}$ concentration should be less than 0.3 micrograms per cubic meter.
For a less-than-significant cumulative TAQ impact, a cancer risk should be less than 100 chances of cancer death from a lifetime exposure at the specified TAC concentration, a non-cancer hazard index should be less than 10.0, and an annual $PM_{2.5}$ concentration should be less than 0.8 micrograms per cubic meter.

Table 1: Toxic Air Contaminant (TAC) Health Risk Screening Analysis – Estimated Health Risks at Proposed Marin County Housing Sites in the Vicinity of Tamalpais Valley

Housing Site(s)	TAC Source in Zone of Influence	Cancer Risk (Chances of Cancer Death per Million Exposed)	Chronic Hazard Index	PM2.5 Concentration
#9 Manzanita Mixed Use (150 Shoreline Highway) # 18 Around Manzanita/ Manzanita Mixed Use (150 Shoreline Highway)	Highway 101	8.3*	0.008*	0.087*
	Highway 1	**13.5***	0.013*	0.156*
	Sausalito Marin City Sanitary District Generator (15 Shoreline Highway)	**14.7**	0.005	0.026
	All Sources	**36.5**	**0.026**	**0.269**
#4 Old Chevron Station (204 Flamingo Road) #14 Armstrong Nursery (217/ 221 Shoreline Highway) #19 Tam Junction Retail (237 Shoreline Highway)	Highway 1	9.7*	0.013*	0.117*
	County of Marin, Crest Marin Pump Station Generator (290 Tennessee Valley Road)	**52.7**	0.019	0.012
	European Tailoring & Cleaners (237 Shoreline Highway)	7.8	0.021	0.0
	Shoreline Cleaners (203 Flamingo Road)	**73.4**	0.195	0.0
	All Sources	**143.6**	**0.248**	**0.129**

Source: *California Environmental Quality Act Air Quality Guidelines* (BAAQMD, Updated May 2011) & *Recommended Methods for Screening and Modeling Local Risks and Hazards* (BAAQMD, May 2010).
* Estimated health risks from identified roadways at the on-site location of closest approach to the roadways.
Exceedances of BAAQMD project or cumulative thresholds shown in **red**.

The DSEIR states that potentially significant impacts related to TACs could occur on certain housing sites identified by the DSEIR screening analysis, but concludes that additional site-specific health risk assessments conducted at these sites, once specific development plans are finalized, would propose site-specific mitigations that would reduce TAC impact to a less-than-significant level (DSEIR, p. 81). While additional site-specific analyses for the Tamalpais Junction sites would be essential for specific residential development plans

proposed for any of the sites in the future, it is not clear that any proposed mitigations identified by such studies would be able to guarantee that TAC impacts would be reduced to a less-than-significant level for all possible exposure circumstances. The best solution for sites that have high TAC exposures would be to situate the proposed housing units on each site so that they are outside the zones of influence of all proximate roadway and stationary sources. But this is not feasible for any the Tamalpais Valley sites; all are relatively small and the entire sites are located within the zones of influence of significant TAC sources. The only possible mitigation measure for the Tamalpais Junction sites would be to fit the proposed residential buildings with air filtration systems to reduce indoor risk to acceptable levels. The problem with this is that there would be no assurance that these systems would be maintained sufficiently to assure acceptable long-term exposures to the future residents (i.e., commonly assumed to be 30-70 years for the purposes of residential health risk assessment). Moreover, indoor air filtration fails to address outdoor exposures to TACs. Children playing outside, or residents gardening, would have no protection from the high levels of TACs, which would pose cancer and other chronic and acute risks that would be additive to the risk imposed by their indoor exposure.

My conclusion is that the DSEIR screening risk assessment is inadequate to assure that future residents of any housing units built on any of the Tamalpais Junction sites would not be exposed to unacceptable TAC levels. Further, there is no evidence that future, in-depth health risk assessments could assure that TAC exposures would meet BAAQMD standards. Therefore, the County should remove sites 4, 9, 14, 18 and 19 from the Housing Element list and focus future County residential planning on sites that clearly meet BAAQMD screening criteria with a healthy margin of safety.

Sincerely,

/s/

Geoffrey H. Hornek