



T 510.836.4200
F 510.836.4205

1939 Harrison Street, Ste. 150
Oakland, CA 94612

www.lozeaudrury.com
richard@lozeaudrury.com

BY E-MAIL

September 5, 2023

Via E-mail

| | |
|--|---------------------------------|
| Eunisses Hernandez, Councilmember | Kevin Golden |
| Paul Krekorian, Councilmember | City Planner |
| Bob Blumenfield, Councilmember | Department of City Planning |
| Nithya Raman, Councilmember | City of Los Angeles |
| Katy Yaroslavsky, Councilmember | 200 N. Spring Street, Room 763 |
| Monica Rodriguez, Councilmember | Los Angeles, CA 90012 |
| Marqueece Harris-Dawson, Councilmember | kevin.golden@lacity.org |
| Curren D. Price, Jr., Councilmember | |
| Heather Hutt, Councilmember | Holly L. Wolcott, City Clerk |
| Traci Park, Councilmember | City of Los Angeles |
| John Lee, Councilmember | 200 N. Spring Street, Suite 360 |
| Hugo Soto-Martinez, Councilmember | Los Angeles, CA 90012 |
| Kevin de Leon, Councilmember | cityclerk@lacity.org |
| Tim McOsker, Councilmember | |
| City Council | |
| City of Los Angeles | |
| 200 N. Spring Street, Suite 525 | |
| Los Angeles, CA 90012 | |
| cpc@lacity.org | |

Re: Proposed CEQA Infill Exemption for 3601-3615 Mission Road/2010-2036 Lincoln Park Avenue (CPC-2022-6189-CU-DB-ZAA-SPR-HCA)

Dear Honorable Members of the City Council:

I am writing on behalf of Supporters Alliance for Environmental Responsibility (“SAFER”), whose members live or work in the City of Los Angeles (“City”), regarding the proposed Class 32 Categorical Exemption from review pursuant to the California Environmental Quality Act (“CEQA”) for CPC-2022-6189-CU-DB-ZAA-SPR-HCA, including all actions related or referring to the proposed construction of a new 7-story apartment building with 184 residential units above 2 levels of automobile parking, to be located at 3601-3615 Mission Road/2010-2036 Lincoln Park Avenue, in the City of Los Angeles (the “Project”).

As discussed below, exempting the Project from CEQA based on the Class 32 Exemption violates CEQA because the terms of the Class 32 exemption do not apply. Since the Project is not exempt from CEQA, an initial study must be prepared to determine the appropriate level of CEQA review required.

LEGAL STANDARD

As the California Supreme Court has held, “[i]f no EIR has been prepared for a nonexempt project, but substantial evidence in the record supports a fair argument that the project may result in significant adverse impacts, the proper remedy is to order preparation of an EIR.” *Communities for a Better Env’t v. South Coast Air Quality Mgmt. Dist.* (2010) 48 Cal.4th 310, 319-20 [citing *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 88]; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491, 504–505. “Significant environmental effect” is defined very broadly as “a substantial or potentially substantial adverse change in the environment.” Pub. Res. Code (“PRC”) § 21068; see also, 14 CCR § 15382. An effect on the environment need not be “momentous” to meet the CEQA test for significance; it is enough that the impacts are “not trivial.” *No Oil, Inc.*, 13 Cal.3d at 83. “The ‘foremost principle’ in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.” *Communities for a Better Env’t v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 109.

The EIR is the very heart of CEQA. *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1214 [“*Bakersfield Citizens*”]; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 927. The EIR is an “environmental ‘alarm bell’ whose purpose is to alert the public and its responsible officials to environmental changes before they have reached the ecological points of no return.” *Bakersfield Citizens*, 124 Cal.App.4th at 1220. The EIR also functions as a “document of accountability,” intended to “demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.” *Laurel Heights Improvements Assn. v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 392. The EIR process “protects not only the environment but also informed self-government.” *Pocket Protectors*, 124 Cal.App.4th at 927.

To achieve its objectives of environmental protection, CEQA has a three-tiered structure. 14 CCR § 15002(k); *Committee to Save the Hollywoodland Specific Plan v. City of Los Angeles* (2008) 161 Cal.App.4th 1168, 1185-86. First, if a project falls into an exempt category, or it can be seen with certainty that the activity in question will not have a significant effect on the environment, no further agency evaluation is required. *Id.* Second, if there is a possibility the project will have a significant effect on the environment, the agency must perform an initial threshold study. *Id.*; 14 CCR § 15063(a). If the study indicates that there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment the agency may issue a negative declaration. *Id.*; 14 CCR §§ 15063(b)(2), 15070. Finally, if the project will have a significant effect on the environment, an EIR is required. *Id.*

The classes of projects which are exempt from the provisions of CEQA are called categorical exemptions. 14 CCR §§ 15300, 15354. “Exemptions to CEQA are narrowly construed and ‘[e]xemption categories are not to be expanded beyond the reasonable scope of their statutory language.’ [Citations].” *Mountain Lion Foundation v. Fish & Game Com.* (1997) 16 Cal.4th 105, 125. The determination as to the appropriate scope of a categorical exemption is a question of law subject to independent, or de novo, review. *San Lorenzo Valley Community Advocates for Responsible Education v. San Lorenzo Valley Unified School Dist.*, (2006) 139 Cal. App. 4th 1356,

1375 “[Q]uestions of interpretation or application of the requirements of CEQA are matters of law. [Citations.] Thus, for example, interpreting the scope of a CEQA exemption presents ‘a question of law, subject to de novo review by this court.’ [Citations].”]. In addition, there are several exceptions to CEQA’s categorical exemptions. *See*, 14 CCR § 15300.2. The City has chosen to proceed under a Categorical Exemption for In-Fill Development, but as demonstrated below, the Project does not qualify for that exemption and the City must prepare an initial study and determine the appropriate level of CEQA review.

Here, the City is relying on the Class 32 in-fill exemption pursuant to CEQA Guidelines section 15332. However, as discussed below, this exemption is improper. Instead, the City must prepare an Initial Study to determine the appropriate level of CEQA review, be it a mitigated negative declaration or an environmental impact report.

DISCUSSION

A. The City Incorrectly Applied CEQA’s Class 32 In-Fill Development Categorical Exemption to the Project and Thus a Full CEQA Analysis Is Required.

The proposed Project does not qualify for a Class 32 In-fill Development Categorical Exemption under CEQA because of the Project’s potentially significant environmental impacts. The City must prepare an Initial Study to determine the appropriate level of CEQA review.

The Class 32 exemption provides:

Class 32 consists of projects characterized as in-fill development meeting the conditions described in this section.

- a. The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.
- b. The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.
- c. The project site has no value, as habitat for endangered, rare or threatened species.
- d. Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.***
- e. The site can be adequately served by all required utilities and public services.

14 CCR § 15332 [emph. added].

In order to approve the Project based on the Exemption the City must make the above findings, and support those findings with substantial evidence. Here, the Exemption cannot apply because the evidence in the record does not support the City’s conclusion that the Project will have no significant air quality and noise impacts.

i. The Project will have significant air quality and health risk impacts, precluding reliance on the Class 32 Exemption.

Environmental engineer Patrick Sutton, P.E. of Baseline Environmental Consulting (“Baseline”) reviewed the Class 32 Categorical Exemption Environmental Checklist and associated technical studies. Baseline’s comment letter is attached as Exhibit A and incorporated herein by reference.

1. Air quality and health risk impacts

One of the primary emissions of concern regarding health effects for land development projects is diesel particulate matter (“DPM”), which can be released during Project construction and operation. DPM consists of fine particles with a diameter less than 2.5 micrometers including a subgroup of ultrafine particles (with a diameter less than 0.1 micrometers). Diesel exhaust also contains a variety of harmful gases and cancer-causing substances. Exposure to DPM is a recognized health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. According to the California Air Resources Board (“CARB”), DPM exposure may lead to the following adverse health effects: aggravated asthma; chronic bronchitis; increased respiratory and cardiovascular hospitalizations; decreased lung function in children; lung cancer; and premature deaths for those with heart or lung disease.

The Exemption failed to prepare a quantified health risk assessment (“HRA”) and failed to mention or evaluate the Project’s construction-related or operational toxic air contaminant (“TAC”) emissions. The failure to do so was incorrect for three reasons.

First, by failing to prepare a full quantified operational or construction HRA, the Exemption fails to connect air quality emissions to health impacts. In failing to connect TAC emissions to potential health risks to nearby receptors, the Project fails to meet the CEQA requirement that projects correlate increases in project-generated emissions to adverse impacts on human health caused by those emissions. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 510.

Second, failing to conduct an HRA for the Project’s operational and construction-related emissions violates the California Department of Justice policy. The DOJ recommends the preparation of a quantitative HRA pursuant to the Office of Environmental Health Hazard Assessment (“OEHHA”), the organization responsible for providing guidance on conducting HRAs in California, as well as local air district guidelines. OEHHA released its most recent guidance document in 2015 describing which types of projects warrant preparation of an HRA. *See* “Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments.” OEHHA recommends that projects lasting at least 2 months be evaluated for cancer risks to nearby sensitive receptors. The OEHHA document also recommends that if a project is expected to last over 6 months, the exposure should be evaluated for the duration of the project.

According to the Exemption, Project construction would last approximately 18 months, which is “substantially longer than the two-month limitation for short-term exposures recommended by OEHHA.” (Ex. A., p. 2.) The nearest off-site sensitive receptors to the project site which could be exposed to DPM emissions generated by project construction are residences located about 50 feet north of the project site. (*Id.*, p. 1.)

Third, in failing to prepare a construction or operational HRA, the Exemption also failed to compare the Project’s cancer risks to the South Coast Air Quality Management District’s threshold of 10 in one million. Without this analysis, the Exemption’s conclusion that the Project will not cause significant air quality effects is not supported by substantial evidence.

Without preparing an HRA, the Exemption has failed to present substantial evidence supporting the conclusion that the Project will have a less-than-significant air quality impact. Accordingly, the City cannot rely on the Class 32 exemption. An initial study must be prepared to determine the appropriate level of CEQA review and to analyze and mitigate this significant impact.

2. Indoor Air Quality

Certified Industrial Hygienist, Francis “Bud” Offermann, PE, CIH, has reviewed the proposed exemption and all relevant documents regarding the Project’s indoor air emissions. Mr. Offermann is a leading expert on indoor air quality and has published extensively on the topic. Based on his review, Mr. Offermann concludes that the Project will likely expose future residents living at the Project to significant impacts related to indoor air quality, and in particular, emissions of the cancer-causing chemical formaldehyde. Mr. Offermann’s CV and expert comments are attached as Exhibit B.

Formaldehyde is a known human carcinogen and is listed by the State of California as a Toxic Air Contaminant (“TAC”). The South Coast Air Quality Management District (“SCAQMD”), the agency responsible for regulating air quality within the South Coast Air Basin—which includes the City of Los Angeles—has established a cancer risk significance threshold from human exposure to carcinogenic TACs of 10 per million. (Ex. B., p. 2.)

Mr. Offermann explains that many composite wood products routinely used in indoor building materials and furnishings commonly found in offices, residences, and hotels contain formaldehyde-based glues which off-gas formaldehyde over long periods of time. He states that “[t]he primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.” (*Id.*, pp. 2-3.)

Mr. Offermann concludes that future residents of the proposed Project will be exposed to a cancer risk from formaldehyde of approximately 120 per million, *even assuming* that all furnishing materials are compliant with the California Air Resources Board’s formaldehyde airborne toxics control measure. (*Id.*, p. 4.) This risk level is **12 times greater** than the SCAQMD’s CEQA significance threshold for airborne cancer risk of 10 per million.

The California Supreme Court has emphasized the importance of air district significance thresholds in providing substantial evidence of a significant adverse environmental impact under CEQA. (*Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 327 [“As the [South Coast Air Quality Management] District’s established significance threshold for NOx is 55 pounds per day, these estimates [of NOx emissions of 201 to 456 pounds per day] constitute substantial evidence supporting a fair argument for a significant adverse impact.”].) Since expert evidence demonstrates that the Project will exceed the SCAQMD’s CEQA significance threshold, there is substantial evidence that an “unstudied, potentially significant environmental effect[]” exists. (See, *Friends of College of San Mateo Gardens v. San Mateo County Community College Dist.* (2016) 1 Cal.5th 937, 958.)

Mr. Offermann concludes that these significant impacts should be further mitigated to reduce the significant health risks that will result from indoor formaldehyde emissions. (*Id.*, pp. 12-14.) Mr. Offermann proposes various feasible mitigation measures to reduce these impacts, including by imposing a requirement that the Project applicant install high-capacity air filters throughout the building and commit to using only composite wood materials that are made with CARB approved no-added formaldehyde (NAF) resins, or ultra-low emitting formaldehyde (ULEF) resins, for all of the buildings’ interior spaces. (Ex. B., p. 12-13.)

Mr. Offermann’s analysis and observations constitute substantial evidence that the Project will produce potentially significant air quality and health impacts which the exemption has failed to address. Therefore, the City must prepare an initial study to further evaluate and mitigate these impacts to the Project’s future residents.

ii. The City has failed to present sufficient evidence showing that the Project will not have significant noise impacts, precluding reliance on the Class 32 Exemption.

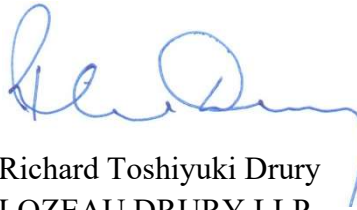
Baseline reviewed the Exemption and the technical noise study prepared for the Project. The Exemption states that the City’s Municipal Code Section 112.05 establishes maximum noise levels for construction equipment and requires the use of mufflers, barriers, and other noise reduction measures to reduce noise levels below those limits. However, according to Baseline, “these limitations would not necessarily apply if it can be proven that the project’s compliance would be technically infeasible despite the use of noise-reducing means or methods.” (Ex. A., p. 2.)

The Exemption’s noise analysis does not include references to support the assumed reductions in noise levels that can be achieved by using barriers and mufflers during construction. (*Id.*) Furthermore, the analysis does not describe what type of barrier material (e.g., plywood, metal, fabric) and design (e.g., wall, curtain, enclosure, shield) would be implemented to achieve a 20 dBA reduction in noise impacts. (*Id.*) Therefore, the Exemption’s assertion that the Project’s noise impacts would be less-than-significant is not supported by substantial evidence. The City must either present substantial evidence showing that the Project’s noise impacts will be less-than-significant, or if it is unable to do so, it must prepare an initial study for the Project.

CONCLUSION

The City cannot rely on a Class 32 exemption because the Project does not meet the terms of the exemption. Accordingly, the City must prepare an initial study to determine the appropriate level of environmental review to undertake pursuant to CEQA. Thank you for considering these comments.

Sincerely,



Richard Toshiyuki Drury
LOZEAU DRURY LLP

EXHIBIT A



26 May 2023

23217-00

Adam Frankel
Lozeau Drury LLP
1939 Harrison St., Suite 150
Oakland, CA 94612

**Subject: Review of Air Quality and Noise Analyses for the Mission and Lincoln
Apartment Project**

Dear Mr. Frankel:

Baseline Environmental Consulting (Baseline) has reviewed the Class 32 Categorical Exemption Environmental Checklist (CE Checklist) prepared for the proposed Mission and Lincoln Apartment Project (project) located at 2036 Lincoln Park Avenue in Los Angeles, California. Based on our review, we have identified flaws in the CE Checklist analysis used to support the opinion that the project qualifies for a categorical exemption from further environmental review under the California Environmental Quality Act (CEQA) based on the project meeting the requirements of Section 15332 (In-Fill Development Projects) of the CEQA Guidelines. The specific concerns identified for potential environmental impacts related to air quality and noise are described in detail below.

POTENTIAL AIR QUALITY IMPACTS

In 1998, the California Air Resources Board (CARB) identified diesel particulate matter (DPM) from diesel-powered engines as a toxic air contaminant based on its potential to cause cancer and other adverse health effects.¹ Project construction would generate DPM emissions from the exhaust of off-road diesel construction equipment. The CE Checklist did not evaluate potential health risks to nearby sensitive receptors exposed to DPM emissions during project construction. The nearest off-site sensitive receptors to the project site which could be exposed to DPM emissions generated by project construction are residences located about 50 feet north of the project site.

The Office of Environmental Health Hazard Assessment (OEHHA) states that “there is valid scientific concern that the rate of short-term exposure may influence the risk – in other words, a higher exposure to a carcinogen over a short period of time may be a greater risk than the

¹ California Air Resources Board (CARB), 1998. Initial Statement of Reasons for Rulemaking; Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant. June.

Mr. Adam Frankel
26 May 2023
Page 2

same total exposure spread over a much longer time period”.² Therefore, the OEHHA guidance includes methods to assist local air pollution control districts in evaluating health risks from “short-term projects such as construction” that last longer than two months. OEHHA does not recommend evaluating cancer risk from construction projects lasting less than two months due to modeling uncertainties. According to page 16 of the CE Checklist, construction would last approximately 18 months, which is substantially longer than the two-month limitation for short-term exposures recommended by OEHHA.

In accordance with OEHHA guidance, we request the applicant prepare a health risk assessment to evaluate and mitigate (if needed) the potential increase in cancer risk to nearby sensitive receptors exposed to DPM emissions during project construction.

POTENTIAL NOISE IMPACTS

The CE Checklist notes that the City’s Municipal Code Section 112.05 establishes maximum noise levels for construction equipment and requires the use of mufflers, barriers, and other noise reduction measures to reduce noise levels below those limits. However, these limitations would not necessarily apply if it can be proven that the project’s compliance would be technically infeasible despite the use of noise-reducing means or methods.

Table V of the CE Checklist (see below) summarized the results of a construction noise analysis for the project, which demonstrates that the project would have a less-than-significant impact related to construction noise with the implementation of noise reduction measures. The analysis was based on the average maximum noise levels of construction equipment at 50 feet provided in the Federal Highway Administration (FHWA) *Construction Noise Handbook*.³ The analysis assumed the use of barriers would reduce average noise levels by 20 dBA and mufflers would reduce average noise levels by 10 to 15 dBA to ensure that noise levels do not exceed the threshold of 75 dBA. Unfortunately, the noise analysis does not include references to support the assumed reductions in noise levels that can be achieved by using barriers and mufflers during construction. Furthermore, the analysis does not describe what type of barrier material (e.g., plywood, metal, fabric) and design (e.g., wall, curtain, enclosure, shield) that would be implemented to achieve a 20 dBA reduction.

² Office of Environmental Health Hazard Assessment (OEHHA), 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. February.

³ Federal Highway Administration, 2006. FHWA Highway Construction Noise Handbook. August.

Table V- Construction Noise Levels

| Phase | Equipment | # | Type | L _{max} at 50 ft (dBA) | LAMC Sec. 112.05 Compliance | Reduced L _{max} at 50 ft (dBA) |
|--------------------------|---------------------------|---|------------|--|-----------------------------------|--|
| Demolition | Concrete Industrial Saws | 1 | Stationary | 90 | Barrier | 70 |
| | Rubber Tired Dozers | 1 | Mobile | 82 | Muffler | 67 |
| | Tractors/Loaders/Backhoes | 3 | Mobile | 80 | Muffler | 65 |
| Site Preparation | Graders | 1 | Mobile | 85 | Muffler | 75 |
| | Rubber Tired Dozers | 1 | Mobile | 82 | Muffler | 67 |
| | Tractors/Loaders/Backhoes | 1 | Mobile | 80 | Muffler | 65 |
| Grading | Graders | 1 | Mobile | 85 | Muffler | 75 |
| | Rubber Tired Dozers | 1 | Mobile | 82 | Muffler | 67 |
| | Tractors/Loaders/Backhoes | 2 | Mobile | 78 | Muffler | 65 |
| Building Construction | Cranes | 1 | Mobile | 81 | Muffler | 66 |
| | Forklifts | 1 | Mobile | 75 | None | 75 |
| | Generator Sets | 1 | Stationary | 81 | Muffler | 66 |
| | Tractors/Loaders/Backhoes | 1 | Mobile | 80 | Muffler | 65 |
| | Welders | 3 | Stationary | 74 | None | 74 |
| Paving | Cement and Mortar Mixers | 1 | Mobile | 79 | Muffler | 64 |
| | Pavers | 1 | Mobile | 77 | Muffler | 62 |
| | Paving Equipment | 1 | Mobile | 77 | Muffler | 62 |
| | Rollers | 1 | Mobile | 80 | Muffler | 65 |
| | Tractors/Loaders/Backhoes | 1 | Mobile | 78 | Muffler | 65 |
| Architectural Coating | Air Compressors | 1 | Stationary | 78 | Barrier | 58 |

According to Appendix A of the FHWA's *Construction Noise Handbook*, a noise barrier that just barely breaks the line-of-sight between the construction equipment and the receptor can reduce noise levels by about 3 dBA. A barrier that completely encloses the construction equipment can reduce noise levels by about 5 to 10 dBA depending on the design. Therefore, the reduced noise level for a concrete industrial saw would range between 80 and 87 dBA, which exceeds the threshold of 75 dBA.

Appendix A of FHWA guide does not discuss noise reductions that could be achieved with the use of mufflers. This may be because that unmitigated maximum noise levels for construction

Mr. Adam Frankel
26 May 2023
Page 4

equipment summarized in the FHWA's *Construction Noise Handbook* and Table V of the CE Checklist already account for the use of mufflers, because these noise levels were derived from surveys of construction sites where equipment may have already been equipped with mufflers. Therefore, the noise levels from numerous types of project equipment (e.g., graders and dozers) may require additional noise reduction measures (e.g., barriers) to ensure noise levels do not exceed the threshold of 75 dBA.

We request that the City provide supporting evidence in the construction noise impact analysis of the CE Checklist to demonstrate how noise reduction measures will be implemented during project construction to ensure the project will achieve a less-than-significant impact related to noise.

CONCLUSIONS

Based on our review of the CE Checklist, additional supporting evidence and analysis are required to demonstrate that the project would not result in significant noise and air quality impacts to qualify for a Class 32 Categorical Exemption.

Sincerely,



Patrick Sutton
Principal Environmental Engineer

Attachment

Staff Resume

Patrick Sutton, P.E.

Principal Environmental Engineer



Areas of Expertise

Air Quality, GHGs, Noise, Hazardous Materials, Geology, and Hydrology

Education

M.S., Civil and Environmental Engineering, University of California – Davis

B.S., Environmental Science, Dickinson College

Registration

Professional Engineer No. 13609 (RI)

Years of Experience

19 Years

Patrick Sutton is an environmental engineer who specializes in the assessment of hazardous materials released into the environment. Mr. Sutton prepares technical reports in support of environmental review, such as Phase I/II Environmental Site Investigations, Air Quality Reports, Greenhouse Gas (GHG) Reduction Plans, and Health Risk Assessments. He has prepared numerous CEQA/NEPA evaluations for air quality, GHGs, geology, hazardous materials, and water quality related to residential, commercial, and industrial projects, as well as large infrastructure developments. His proficiency in a wide range of modeling software (AERMOD, CalEEMod, RCEM, CT-EMFAC) as well as relational databases, GIS, and graphics design allows him to thoroughly and efficiently assess and mitigate environmental concerns.

For mixed-use development projects, Mr. Sutton has prepared health risk assessments for sensitive receptors exposed to toxic air contaminants based on air dispersion modeling. He has also prepared GHG Reduction Plans to demonstrate how projects can comply with State and/or local GHG reduction goals. For large highway infrastructure improvement projects, Mr. Sutton has prepared air quality and hazardous materials technical reports in accordance with Caltrans requirements. Air quality assessments include the evaluation of criteria air pollutants, mobile source air toxics, and GHG emissions to support environmental review of the project under CEQA/NEPA and to determine conformity with the State Implementation Plan. Hazardous materials investigations include sampling and statistically analysis of aerially-deposited lead adjacent to highway corridors.

Project Experience

Oakland Downtown Specific Plan EIR. Prepared a program- and project-level Air Quality and GHG Emissions analysis. Developed a mitigation measure with performance standards to ensure GHG emissions from future projects comply with the Citywide 2030 GHG reduction target.

I-680 Express Lanes from SR 84 to Alcosta Boulevard Project. Prepared Initial Site Assessment and Preliminary Site Investigation to evaluate contaminants of potential concern in soil and groundwater. Prepared Air Quality Report to determine the project's conformity to federal air quality regulations and to support environmental review of the project under CEQA and NEPA.

Altamont Corridor Expressway (ACE/Forward) Project EIR/EIS. Prepared a program- and project-level Hazardous Materials analysis for over 120 miles of railroad corridor from San Jose to Merced. Hazardous materials concerns, such as release sites, petroleum pipelines, agricultural pesticides, and nearby school sites were evaluated in GIS.

Stonegate Residential Subdivision EIR. Prepared a project-level Hydrology and Water Quality analysis for a residential development located within the 100-year floodplain. The proposed project included modifications to existing levees and flood channels.

BART Silicon Valley Extension Project. Prepared Initial Site Assessment and Hazardous Materials EIS/EIR section for extending 6 miles of proposed BART service through the Cities of San Jose and Santa Clara.

EXHIBIT B



INDOOR ENVIRONMENTAL ENGINEERING



1448 Pine Street, Suite 103 San Francisco, California 94109

Telephone: (415) 567-7700

E-mail: offer mann@IEE-SF.com

<http://www.iee-sf.com>

Date: May 15, 2023

To: Adam Frankel
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
Oakland, California 94612

From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: Mission and Lincoln Apartments Project, Los Angeles, CA (IEE File Reference: P-4708)

Pages: 19

Indoor Air Quality Impacts

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings relative to outdoor air because many of the materials and products used indoors contain

and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson, 2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

Indoor Formaldehyde Concentrations Impact. In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 $\mu\text{g}/\text{day}$. The NSRL concentration of formaldehyde that represents a daily dose of 40 μg is 2 $\mu\text{g}/\text{m}^3$, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m^3 , and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 $\mu\text{g}/\text{m}^3$. The median indoor formaldehyde concentration was 36 $\mu\text{g}/\text{m}^3$, and ranged from 4.8 to 136 $\mu\text{g}/\text{m}^3$, which corresponds to a median exceedance of the 2 $\mu\text{g}/\text{m}^3$ NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 $\mu\text{g}/\text{m}^3$, is 180 per million as a result of formaldehyde alone. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the San Diego Air Quality Management District (SDAQMD, 2015).

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017b). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 $\mu\text{g}/\text{m}^3$ to 28% for the Acute REL of 55 $\mu\text{g}/\text{m}^3$.

The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and

particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Singer et. al., 2019), and found that the median indoor formaldehyde in new homes built after 2009 with CARB Phase 2 Formaldehyde ATCM materials had lower indoor formaldehyde concentrations, with a median indoor concentrations of $22.4 \mu\text{g}/\text{m}^3$ (18.2 ppb) as compared to a median of $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS. Unlike in the CNHS study where formaldehyde concentrations were measured with pumped DNPH samplers, the formaldehyde concentrations in the HENGH study were measured with passive samplers, which were estimated to under-measure the true indoor formaldehyde concentrations by approximately 7.5%. Applying this correction to the HENGH indoor formaldehyde concentrations results in a median indoor concentration of $24.1 \mu\text{g}/\text{m}^3$, which is 33% lower than the $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 33% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 120 per million for homes built with CARB compliant composite wood products. This median lifetime cancer risk is more than 12 times the OEHHA 10 in a million cancer risk threshold (OEHHA, 2017a).

With respect to the Mission and Lincoln Apartments Project, Los Angeles, CA, the buildings consist of residential spaces.

The residential occupants will potentially have continuous exposure (e.g. 24 hours per day, 52 weeks per year). These exposures are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residential construction.

Because these residences will be constructed with CARB Phase 2 Formaldehyde ATCM materials, and be ventilated with the minimum code required amount of outdoor air, the indoor residential formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of $24.1 \mu\text{g}/\text{m}^3$ (Singer et. al., 2020)

Assuming that the residential occupants inhale 20 m^3 of air per day, the average 70-year lifetime formaldehyde daily dose is $482 \mu\text{g}/\text{day}$ for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million. For occupants that do not have continuous exposure, the cancer risk will be proportionally less but still substantially over the CEQA cancer risk of 10 per million (e.g. for 12/hour/day occupancy, more than 6 times the CEQA cancer risk of 10 per million).

In addition, we note that the average outdoor air concentration of formaldehyde in California is 3 ppb, or $3.7 \mu\text{g}/\text{m}^3$, (California Air Resources Board, 2004), and thus represents an average pre-existing background airborne cancer risk of 1.85 per million. Thus, the indoor air formaldehyde exposures describe above exacerbate this pre-existing risk resulting from outdoor air formaldehyde exposures.

Additionally, the SCAQMD's Multiple Air Toxics Exposure Study ("MATES V") identifies an existing cancer risk at the Project site of 749 per million due to the site's elevated ambient air contaminant concentrations, which are due to the area's high levels of vehicle traffic. These impacts would further exacerbate the pre-existing cancer risk to the building occupants, which result from exposure to formaldehyde in both indoor and outdoor air.

Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from composite wood products.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

The following describes a method that should be used, prior to construction in the environmental review under CEQA, for determining whether the indoor concentrations resulting from the formaldehyde emissions of specific building materials/furnishings selected exceed cancer and non-cancer guidelines. Such a design analyses can be used to identify those materials/furnishings prior to the completion of the City's CEQA review and project approval, that have formaldehyde emission rates that contribute to indoor concentrations that exceed cancer and non-cancer guidelines, so that alternative lower emitting materials/furnishings may be selected and/or higher minimum outdoor air ventilation rates can be increased to achieve acceptable indoor concentrations and incorporated as mitigation measures for this project.

Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment

This formaldehyde emissions assessment should be used in the environmental review under CEQA to assess the indoor formaldehyde concentrations from the proposed loading of building materials/furnishings, the area-specific formaldehyde emission rate data for building materials/furnishings, and the design minimum outdoor air ventilation

rates. This assessment allows the applicant (and the City) to determine, before the conclusion of the environmental review process and the building materials/furnishings are specified, purchased, and installed, if the total chemical emissions will exceed cancer and non-cancer guidelines, and if so, allow for changes in the selection of specific material/furnishings and/or the design minimum outdoor air ventilations rates such that cancer and non-cancer guidelines are not exceeded.

1.) Define Indoor Air Quality Zones. Divide the building into separate indoor air quality zones, (IAQ Zones). IAQ Zones are defined as areas of well-mixed air. Thus, each ventilation system with recirculating air is considered a single zone, and each room or group of rooms where air is not recirculated (e.g. 100% outdoor air) is considered a separate zone. For IAQ Zones with the same construction material/furnishings and design minimum outdoor air ventilation rates. (e.g. hotel rooms, apartments, condominiums, etc.) the formaldehyde emission rates need only be assessed for a single IAQ Zone of that type.

2.) Calculate Material/Furnishing Loading. For each IAQ Zone, determine the building material and furnishing loadings (e.g., m^2 of material/ m^2 floor area, units of furnishings/ m^2 floor area) from an inventory of all potential indoor formaldehyde sources, including flooring, ceiling tiles, furnishings, finishes, insulation, sealants, adhesives, and any products constructed with composite wood products containing urea-formaldehyde resins (e.g., plywood, medium density fiberboard, particleboard).

3.) Calculate the Formaldehyde Emission Rate. For each building material, calculate the formaldehyde emission rate ($\mu g/h$) from the product of the area-specific formaldehyde emission rate ($\mu g/m^2-h$) and the area (m^2) of material in the IAQ Zone, and from each furnishing (e.g. chairs, desks, etc.) from the unit-specific formaldehyde emission rate ($\mu g/unit-h$) and the number of units in the IAQ Zone.

NOTE: As a result of the high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014), most manufacturers of building materials furnishings sold in the United States conduct chemical emission rate tests using the California Department of Health “Standard Method for the Testing and

Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), or other equivalent chemical emission rate testing methods. Most manufacturers of building furnishings sold in the United States conduct chemical emission rate tests using ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions (BIFMA, 2018), or other equivalent chemical emission rate testing methods.

CDPH, BIFMA, and other chemical emission rate testing programs, typically certify that a material or furnishing does not create indoor chemical concentrations in excess of the maximum concentrations permitted by their certification. For instance, the CDPH emission rate testing requires that the measured emission rates when input into an office, school, or residential model do not exceed one-half of the OEHHA Chronic Exposure Guidelines (OEHHA, 2017b) for the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017). These certifications themselves do not provide the actual area-specific formaldehyde emission rate (i.e., $\mu\text{g}/\text{m}^2\text{-h}$) of the product, but rather provide data that the formaldehyde emission rates do not exceed the maximum rate allowed for the certification. Thus, for example, the data for a certification of a specific type of flooring may be used to calculate that the area-specific emission rate of formaldehyde is less than $31 \mu\text{g}/\text{m}^2\text{-h}$, but not the actual measured specific emission rate, which may be 3, 18, or $30 \mu\text{g}/\text{m}^2\text{-h}$. These area-specific emission rates determined from the product certifications of CDPH, BIFA, and other certification programs can be used as an initial estimate of the formaldehyde emission rate.

If the actual area-specific emission rates of a building material or furnishing is needed (i.e. the initial emission rates estimates from the product certifications are higher than desired), then that data can be acquired by requesting from the manufacturer the complete chemical emission rate test report. For instance if the complete CDPH emission test report is requested for a CDHP certified product, that report will provide the actual area-specific emission rates for not only the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017), but also all of the cancer and reproductive/developmental chemicals listed in the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), all of the toxic air contaminants (TACs) in the California Air

Resources Board Toxic Air Contamination List (CARB, 2011), and the 10 chemicals with the greatest emission rates.

Alternatively, a sample of the building material or furnishing can be submitted to a chemical emission rate testing laboratory, such as Berkeley Analytical Laboratory (<https://berkeleyanalytical.com>), to measure the formaldehyde emission rate.

4.) Calculate the Total Formaldehyde Emission Rate. For each IAQ Zone, calculate the total formaldehyde emission rate (i.e. µg/h) from the individual formaldehyde emission rates from each of the building material/furnishings as determined in Step 3.

5.) Calculate the Indoor Formaldehyde Concentration. For each IAQ Zone, calculate the indoor formaldehyde concentration (µg/m³) from Equation 1 by dividing the total formaldehyde emission rates (i.e. µg/h) as determined in Step 4, by the design minimum outdoor air ventilation rate (m³/h) for the IAQ Zone.

$$C_{in} = \frac{E_{total}}{Q_{oa}} \text{ (Equation 1)}$$

where:

C_{in} = indoor formaldehyde concentration (µg/m³)

E_{total} = total formaldehyde emission rate (µg/h) into the IAQ Zone.

Q_{oa} = design minimum outdoor air ventilation rate to the IAQ Zone (m³/h)

The above Equation 1 is based upon mass balance theory, and is referenced in Section 3.10.2 “Calculation of Estimated Building Concentrations” of the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017).

6.) Calculate the Indoor Exposure Cancer and Non-Cancer Health Risks. For each IAQ Zone, calculate the cancer and non-cancer health risks from the indoor formaldehyde concentrations determined in Step 5 and as described in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015).

7.) Mitigate Indoor Formaldehyde Exposures of exceeding the CEQA Cancer and/or Non-Cancer Health Risks. In each IAQ Zone, provide mitigation for any formaldehyde exposure risk as determined in Step 6, that exceeds the CEQA cancer risk of 10 per million or the CEQA non-cancer Hazard Quotient of 1.0.

Provide the source and/or ventilation mitigation required in all IAQ Zones to reduce the health risks of the chemical exposures below the CEQA cancer and non-cancer health risks.

Source mitigation for formaldehyde may include:

- 1.) reducing the amount materials and/or furnishings that emit formaldehyde
- 2.) substituting a different material with a lower area-specific emission rate of formaldehyde

Ventilation mitigation for formaldehyde emitted from building materials and/or furnishings may include:

- 1.) increasing the design minimum outdoor air ventilation rate to the IAQ Zone.

NOTE: Mitigating the formaldehyde emissions through use of less material/furnishings, or use of lower emitting materials/furnishings, is the preferred mitigation option, as mitigation with increased outdoor air ventilation increases initial and operating costs associated with the heating/cooling systems.

Further, we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), and use the procedure described earlier above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off

gassing of formaldehyde.

Outdoor Air Ventilation Impact. Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test Day, and 15% of the homes did not use their windows during the entire preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 air changes per hour (ach), with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

The Mission and Lincoln Apartment Project is close to roads with moderate to high traffic (e.g., Lincoln Park Avenue, North Mission Road, Valley Boulevard, etc.), and thus the Project site is a sound impacted site.

According to the Mission and Lincoln Apartment Project, 2036 Lincoln Park Avenue, Los Angeles, CA, Class 32 Categorical Exemption Environmental Checklist (Luz Entitlement Services, 2022), only four short-term measurements of the ambient noise level were made on August 5, 2022. Table IV states that the existing ambient noise levels range from 54.2 dBA to 62.6 dBA Leq, and in Table VI, the existing ambient noise levels range with the Project HVAC unit operation range from 54.2 from 62.9 dBA Leq.

However, these acoustic measurements are only short-term Leq measurements, made on a single day, August 5, 2022, during the pandemic when traffic activity was reduced.

In order to design the building for this Project such that interior noise levels are acceptable, an acoustic study of the existing and future ambient noise levels needs to be conducted. An acoustic study should be conducted to assess the local ambient sound levels (i.e., dBA CNEL or Ldn) over a one-week period so that the building envelope and windows can be designed with a sufficient STC such that the indoor noise levels are acceptable.

As a result of the high outdoor noise levels, the current project will require a mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

PM_{2.5} Outdoor Concentrations Impact. An additional impact of the nearby motor vehicle traffic associated with this project, are the outdoor concentrations of PM_{2.5}. According to the Mission and Lincoln Apartment Project, 2036 Lincoln Park Avenue, Los Angeles, CA, Class 32 Categorical Exemption Environmental Checklist (Luz Entitlement Services, 2022), the Project is located in the South Coast Air Basin, which is a State and Federal non-attainment area for PM_{2.5}.

Additionally, the SCAQMD's MATES V study cites an existing cancer risk of 749 per million at the Project site due to the site's high concentration of ambient air contaminants resulting from the area's high levels of motor vehicle traffic.

An air quality analyses should be conducted to determine the concentrations of PM_{2.5} in the outdoor and indoor air that people inhale each day. This air quality analyses needs to consider the cumulative impacts of the project related emissions, existing and projected future emissions from local PM_{2.5} sources (e.g. stationary sources, motor vehicles, and airport traffic) upon the outdoor air concentrations at the Project site. If the outdoor concentrations are determined to exceed the California and National annual average PM_{2.5} exceedence concentration of 12 µg/m³, or the National 24-hour average exceedence concentration of 35 µg/m³, then the buildings need to have a mechanical supply of outdoor air that has air filtration with sufficient removal efficiency, such that the indoor

concentrations of outdoor PM_{2.5} particles is less than the California and National PM_{2.5} annual and 24-hour standards.

It is my experience that based on the projected high traffic noise levels, the annual average concentration of PM_{2.5} will exceed the California and National PM_{2.5} annual and 24-hour standards and warrant installation of high efficiency air filters (i.e. MERV 13 or higher) in all mechanically supplied outdoor air ventilation systems.

Indoor Air Quality Impact Mitigation Measures

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins (CARB, 2009). CARB Phase 2 certified composite wood products, or ultra-low emitting formaldehyde (ULEF) resins, do not insure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million. Only composite wood products manufactured with CARB approved no-added formaldehyde (NAF) resins, such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHHA cancer risk of 10 per million is met.

Alternatively, conduct the previously described Pre-Construction Building Material/Furnishing Chemical Emissions Assessment, to determine that the combination of formaldehyde emissions from building materials and furnishings do not create indoor formaldehyde concentrations that exceed the CEQA cancer and non-cancer health risks.

It is important to note that we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and

Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017), and use the procedure described above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Mitigation. Provide each habitable room with a continuous mechanical supply of outdoor air that meets or exceeds the California 2016 Building Energy Efficiency Standards (California Energy Commission, 2015) requirements of the greater of 15 cfm/occupant or 0.15 cfm/ft² of floor area. Following installation of the system conduct testing and balancing to insure that required amount of outdoor air is entering each habitable room and provide a written report documenting the outdoor airflow rates. Do not use exhaust only mechanical outdoor air systems, use only balanced outdoor air supply and exhaust systems or outdoor air supply only systems. Provide a manual for the occupants or maintenance personnel, that describes the purpose of the mechanical outdoor air system and the operation and maintenance requirements of the system.

PM_{2.5} Outdoor Air Concentration Mitigation. Install air filtration with sufficient PM_{2.5} removal efficiency (e.g. MERV 13 or higher) to filter the outdoor air entering the mechanical outdoor air supply systems, such that the indoor concentrations of outdoor PM_{2.5} particles are less than the California and National PM_{2.5} annual and 24-hour standards. Install the air filters in the system such that they are accessible for replacement by the occupants or maintenance personnel. Include in the mechanical outdoor air ventilation system manual instructions on how to replace the air filters and the estimated frequency of replacement.

References

BIFA. 2018. BIFMA Product Safety and Performance Standards and Guidelines.
www.bifma.org/page/standardsoverview

California Air Resources Board. 2004. Formaldehyde in the Home.

<https://ww3.arb.ca.gov/research/indoor/formaldgl08-04.pdf>

California Air Resources Board. 2009. Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. California Environmental Protection Agency, Sacramento, CA.

<https://www.arb.ca.gov/regact/2007/compwood07/fro-final.pdf>

California Air Resources Board. 2011. Toxic Air Contaminant Identification List. California Environmental Protection Agency, Sacramento, CA.

<https://www.arb.ca.gov/toxics/id/taclist.htm>

California Building Code. 2001. California Code of Regulations, Title 24, Part 2 Volume 1, Appendix Chapter 12, Interior Environment, Division 1, Ventilation, Section 1207: 2001 California Building Code, California Building Standards Commission. Sacramento, CA.

California Building Standards Commission (2014). 2013 California Green Building Standards Code. California Code of Regulations, Title 24, Part 11. California Building Standards Commission, Sacramento, CA <http://www.bsc.ca.gov/Home/CALGreen.aspx>.

California Energy Commission, PIER Program. CEC-500-2007-033. Final Report, ARB Contract 03-326. Available at: www.arb.ca.gov/research/apr/past/03-326.pdf.

California Energy Commission, 2015. 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulations, Title 24, Part 6. <http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf>

CDPH. 2017. Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1.

California Department of Public Health, Richmond, CA.
<https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx>.
Environmental Impact Report. SCH No. 2018011001.

EPA. 2011. Exposure Factors Handbook: 2011 Edition, Chapter 16 – Activity Factors. Report EPA/600/R-09/052F, September 2011. U.S. Environmental Protection Agency, Washington, D.C.

Hodgson, A. T., D. Beal, J.E.R. McIlvaine. 2002. Sources of formaldehyde, other aldehydes and terpenes in a new manufactured house. Indoor Air 12: 235–242.

Luz Entitlement Services. 2022. Mission and Lincoln Apartment Project, 2036 Lincoln Park Avenue, Los Angeles, CA, Class 32 Categorical Exemption Environmental Checklist.

OEHHA (Office of Environmental Health Hazard Assessment). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments.

OEHHA (Office of Environmental Health Hazard Assessment). 2017a. Proposition 65 Safe Harbor Levels. No Significant Risk Levels for Carcinogens and Maximum Allowable Dose Levels for Chemicals Causing Reproductive Toxicity. Available at: <http://www.oehha.ca.gov/prop65/pdf/safeharbor081513.pdf>

OEHHA - Office of Environmental Health Hazard Assessment. 2017b. All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels. Available at: <http://oehha.ca.gov/air/allrels.html>

Offermann, F. J. 2009. Ventilation and Indoor Air Quality in New Homes. California Air Resources Board and California Energy Commission, PIER Energy-Related

Environmental Research Program. Collaborative Report. CEC-500-2009-085.
<https://www.arb.ca.gov/research/apr/past/04-310.pdf>

Offermann, F. J. and A. T. Hodgson. 2011. Emission Rates of Volatile Organic Compounds in New Homes. Proceedings Indoor Air 2011 (12th International Conference on Indoor Air Quality and Climate 2011), June 5-10, 2011, Austin, TX.

San Diego Air Quality Management District (SDAQMD). 2015. California Environmental Quality Act Air Quality Handbook. San Diego Air Quality Management District.

Singer, B.C, Chan, W.R, Kim, Y., Offermann, F.J., and Walker I.S. 2020. Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation. Indoor Air, Vol 30, Issue 5, 885-899.

USGBC. 2014. LEED BD+C Homes v4. U.S. Green Building Council, Washington, D.C.
<http://www.usgbc.org/credits/homes/v4>

APPENDIX A

INDOOR FORMALDEHYDE CONCENTRATIONS AND THE CARB FORMALDEHYDE ATCM

With respect to formaldehyde emissions from composite wood products, the CARB ATCM regulations of formaldehyde emissions from composite wood products, do not assure healthful indoor air quality. The following is the stated purpose of the CARB ATCM regulation - *The purpose of this airborne toxic control measure is to “reduce formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured for sale in California”*. In other words, the CARB ATCM regulations do not “assure healthful indoor air quality”, but rather “reduce formaldehyde emissions from composite wood products”.

Just how much protection do the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products? Definitely some, but certainly the regulations do not “*assure healthful indoor air quality*” when CARB Phase 2 products are utilized. As shown in the Chan 2019 study of new California homes, the median indoor formaldehyde concentration was of $22.4 \mu\text{g}/\text{m}^3$ (18.2 ppb), which corresponds to a cancer risk of 112 per million for occupants with continuous exposure, which is more than 11 times the CEQA cancer risk of 10 per million.

Another way of looking at how much protection the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products is to calculate the maximum number of square feet of composite wood product that can be in a residence without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy.

For this calculation I utilized the floor area ($2,272 \text{ ft}^2$), the ceiling height (8.5 ft), and the number of bedrooms (4) as defined in Appendix B (New Single-Family Residence Scenario) of the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, 2017, California

Department of Public Health, Richmond, CA. <https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx>.

For the outdoor air ventilation rate I used the 2019 Title 24 code required mechanical ventilation rate (ASHRAE 62.2) of 106 cfm (180 m³/h) calculated for this model residence. For the composite wood formaldehyde emission rates I used the CARB ATCM Phase 2 rates.

The calculated maximum number of square feet of composite wood product that can be in a residence, without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 15 ft² (0.7% of the floor area), or
Particle Board – 30 ft² (1.3% of the floor area), or
Hardwood Plywood – 54 ft² (2.4% of the floor area), or
Thin MDF – 46 ft² (2.0 % of the floor area).

For offices and hotels the calculated maximum amount of composite wood product (% of floor area) that can be used without exceeding the CEQA cancer risk of 10 per million for occupants, assuming 8 hours/day occupancy, and the California Mechanical Code minimum outdoor air ventilation rates are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 3.6 % (offices) and 4.6% (hotel rooms), or
Particle Board – 7.2 % (offices) and 9.4% (hotel rooms), or
Hardwood Plywood – 13 % (offices) and 17% (hotel rooms), or
Thin MDF – 11 % (offices) and 14 % (hotel rooms)

Clearly the CARB ATCM does not regulate the formaldehyde emissions from composite wood products such that the potentially large areas of these products, such as for flooring, baseboards, interior doors, window and door trims, and kitchen and bathroom cabinetry,

could be used without causing indoor formaldehyde concentrations that result in CEQA cancer risks that substantially exceed 10 per million for occupants with continuous occupancy.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

If CARB Phase 2 compliant or ULEF composite wood products are utilized in construction, then the resulting indoor formaldehyde concentrations should be determined in the design phase using the specific amounts of each type of composite wood product, the specific formaldehyde emission rates, and the volume and outdoor air ventilation rates of the indoor spaces, and all feasible mitigation measures employed to reduce this impact (e.g. use less formaldehyde containing composite wood products and/or incorporate mechanical systems capable of higher outdoor air ventilation rates). See the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Alternatively, and perhaps a simpler approach, is to use only composite wood products (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins.