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September 20, 2022

Via E-mail

Marqueece Harris- Dawson, Chair
Gilbert A. Cedillo, Councilmember
Bob Blumenfield, Councilmember
John S. Lee, Councilmember
Monica Rodriguez, Councilmember
200 N. Spring Street
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More Song, City Planner
Department of City Planning
City of Los Angeles
200 N. Spring Street, Room 763
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Re: Comment on Sustainable Communities Environmental Assessment, Dinah's Sepulveda Project (ENV-2021-4938-SCEA)

Dear Chair Dawson, Honorable PLUM Committee Councilmembers, and Mr. Song:

I am writing on behalf of Supporters Alliance for Environmental Responsibility ("SAFER") regarding the Sustainable Communities Environmental Assessment ("SCEA") prepared for the Dinah's Sepulveda Project (ENV-2021-4938-SCEA), including all actions related or referring to the proposed development of an eight-story, 362-unit multi-family residential building, with approximately 3,700 square feet of ground floor restaurant space, located at 6501-6521 South Sepulveda Boulevard and 6502-6520 South Arizona Avenue in the City of Los Angeles ("Project").

After reviewing the SCEA with the assistance of Certified Industrial Hygienist, Francis "Bud" Offermann, PE, CIH, air quality experts Matt Hagemann, P.G., C.Hg., and Paul E. Rosenfeld, Ph.D., of the Soil/Water/Air Protection Enterprise ("SWAPE"), and noise expert Deborah Ju of Wilson Ihrig, SAFER requests that the City of Los Angeles ("City") Planning Division refrain from taking any action on the Project and SCEA at this time because the SCEA's conclusions about the Project's impacts to air quality and noise are not supported by substantial evidence. In addition, we request that the City prepare an environmental impact

report ("EIR") for the Project pursuant to the California Environmental Quality Act ("CEQA"), Public Resources Code section 21000, et seq.

Mr. Offerman's comment and curriculum vitae are attached as Exhibit A hereto and is incorporated herein by reference in its entirety. SWAPE's comment and the consultants' curriculum vitae are attached as Exhibit B hereto and are incorporated herein by reference in their entirety. Ms. Ju's comment and curriculum vitae are attached as Exhibit C hereto and is incorporated herein by reference in its entirety.

I. PROJECT DESCRIPTION

The 96,030-SF (2.205-acre) Project site is located at 6501-6521 S. Sepulveda Boulevard and 6502-6520 S. Arizona Avenue in the Westchester-Playa del Rey Community Plan area (APNs 4110-001-006, 4110-001-007, and 4110-001-024). The site is bounded by an undeveloped parcel and Centinela Avenue to the north, a surface parking lot associated with a hotel to the south, Arizona Avenue to the west, and Sepulveda Boulevard to the east. The northern portion of the Project Site is currently improved with a single-story, multi-tenant commercial plaza and a single-story, multi-tenant industrial/mixed-use building containing a total of approximately 22,222 square feet of commercial space and 1,778 square feet of restaurant space, as well as a small locksmith shop, all with associated surface parking. The southern portion of the site is improved with an existing approximately 7,760-square-foot diner (Dinah's Family Restaurant) and associated surface parking.

The existing Dinah's Family Restaurant is a one-story structure constructed in 1957. Dinah's is eligible for listing in the California Register of Historical Places (California Register) and as a Los Angeles Historic-Cultural Monument. Vehicular access at the site is provided by three two-way driveway cuts, one on Sepulveda Boulevard and two on Arizona Avenue. Regional access to the Project Site is provided via Interstate 405, located approximately 300 feet east of the site.

A SCEA has been prepared for the proposed Project pursuant to Section 21155.2 of the California Public Resources Code ("PRC").

II. LEGAL STANDARD

Sustainable Communities Environmental Assessment under SB 375

The California Legislature passed SB 375, also known as the Sustainable Communities and Climate Protection Act, in an effort to integrate transportation and land use planning to reduce greenhouse gas ("GHG") emissions. (*See* California Senate Bill 375, Chapter 728, section 1(a).) SB 375 required the state Air Resources Board to develop regional emission reduction targets for cars and light trucks. (Gov. Code § 65080(b)(2)(A).) In addition, federally-designated metropolitan planning organizations that prepare regional transportation plans were required to include in those plans a "sustainable communities strategy" to achieve the emission targets.

(Gov. Code § 65080(b)(2)(B).)

CEQA allows for the streamlining of environmental review for “transit priority projects” meeting certain criteria. (Pub. Res. Code §§ 21155, 21155.1, 21155.2.) To qualify as a transit priority project, a project must:

- (1) contain at least 50 percent residential use, based on total building square footage and, if the project contains between 26 percent and 50 percent nonresidential uses, a floor area ratio of not less than 0.75;
- (2) provide a minimum net density of at least 20 dwelling units per acre; and
- (3) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan.

(Pub. Res. Code § 21155(b).) A transit priority project is eligible for CEQA's streamlining provisions where:

[The transit priority project] is consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either a sustainable communities strategy or an alternative planning strategy, for which the State Air Resources Board . . . has accepted a metropolitan planning organization's determination that the sustainable communities strategy or the alternative planning strategy would, if implemented, achieve the greenhouse gas emission reduction targets.

(Pub. Res. Code § 21155(a).) In 2020, the Southern California Association of Governments' (“SCAG”) Regional Council formally adopted the Connect SoCal 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (“2020–2045 RTP/SCS”), which was accepted by the California Air Resources Board (“CARB”) on October 30, 2020, and was certified on May 7, 2020.

If “all feasible mitigation measures, performance standards, or criteria set forth in the prior applicable environmental impact reports and adopted in findings made pursuant to Section 21081” are applied to a transit priority project, the project is eligible to conduct environmental review using a Sustainable Communities Environmental Assessment (“SCEA”). (Pub. Res. Code § 21155.2.) A SCEA must contain an initial study which “identif[ies] all significant or potentially significant impacts of the transit priority project . . . based on substantial evidence in light of the whole record.” (Pub. Res. Code § 21155.2(b)(1).) The initial study must also “identify any cumulative effects that have been adequately addressed and mitigated pursuant to the requirements of this division in prior applicable certified environmental impact reports.” (*Id.*) The SCEA must then “contain measures that either avoid or mitigate to a level of insignificance all potentially significant or significant effects of the project required to be identified in the initial study.” (Pub. Res. Code § 21155(b)(2).) The SCEA is not required to discuss growth inducing impacts or any project specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network. (Pub. Res. Code § 21159.28(a).)

After circulating the SCEA for public review and considering all comments, a lead agency may approve the SCEA with findings that all potentially significant impacts have been identified and mitigated to a less-than-significant level. (Pub. Res. Code § 21155(b)(3), (b)(4), (b)(5).) A lead agency's approval of a SCEA must be supported by substantial evidence. (Pub. Res. Code §21155(b)(7).)

III. ANALYSIS

A. The SCEA's conclusions regarding the Project's air quality impacts are not supported by substantial evidence.

Indoor air quality expert Francis "Bud" Offermann, PE, CIH, and air quality experts Matt Hagemann, P.G., C.Hg., and Paul E. Rosenfeld, Ph.D., of the Soil/Water/Air Protection Enterprise ("SWAPE") reviewed the SCEA and found that the SCEA's conclusions as to the Project's air quality impacts were not supported by substantial evidence. Mr. Offermann found that the SCEA failed to address and mitigate the human health impacts from indoor emissions of formaldehyde. Mr. Offermann's comment and CV are attached as Exhibit A. SWAPE found that SCEA failed to properly model the Project's emissions and failed to properly evaluate the Project's health risk impacts from emissions of diesel particulate matter. SWAPE's comment and CVs are attached as Exhibit B.

i. The SCEA failed to discuss or mitigate the Project's significant indoor air quality impacts.

The SCEA fails to discuss, disclose, analyze, and mitigate the significant health risks posed by the Project from formaldehyde, a toxic air contaminant ("TAC"). Certified Industrial Hygienist, Francis "Bud" Offermann, PE, CIH, conducted a review of the Project, the SCEA, and relevant documents regarding the Project's indoor air emissions. Mr. Offermann is one of the world's leading experts on indoor air quality, in particular emissions of formaldehyde, and has published extensively on the topic. As discussed below and set forth in Mr. Offermann's comments, the Project's emissions of formaldehyde to air will result in very significant cancer risks to future residents of the Project. Mr. Offermann's expert opinion demonstrates the Project's significant health risk impacts, which the City has a duty to investigate, disclose, and mitigate in the SCEA prior to approval. Mr. Offermann's comment and curriculum vitae are attached as Exhibit A.

Formaldehyde is a known human carcinogen and listed by the State as a TAC. SCAQMD has established a significance threshold of health risks for carcinogenic TACs of 10 in a million and a cumulative health risk threshold of 100 in a million. The SCEA fails to acknowledge the significant indoor air emissions that will result from the Project. Specifically, there is no discussion of impacts or health risks, no analysis, and no identification of mitigations for significant emissions of formaldehyde to air from the Project.

Mr. Offermann explains that many composite wood products typically used in home and apartment building construction contain formaldehyde-based glues which off-gas formaldehyde over a very long time period. He states, "The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particle board. These materials are commonly used in residential, office, and retail building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims." (Ex. A, p. 2.)

Mr. Offermann found that future residents of the Project's residential units will be exposed to a cancer risk from formaldehyde of approximately 120 per million, *even assuming that* all materials are compliant with the California Air Resources Board's formaldehyde airborne toxics control measure. (Ex. A, pp. 3-4.) This is more than 12 times SCAQMD's CEQA significance threshold of 10 per million. (*Id.*)

Mr. Offermann concludes that these significant environmental impacts must be analyzed and mitigation measures should be imposed to reduce the risk of formaldehyde exposure. (Ex. A, pp. 11-12.) He prescribes a methodology for estimating the Project's formaldehyde emissions in order to do a more project-specific health risk assessment. (*Id.*, pp. 6-12.) Mr. Offermann also suggests several feasible mitigation measures, such as requiring the use of no-added-formaldehyde composite wood products, which are readily available. (*Id.*, pp. 12-13.) Mr. Offermann also suggests requiring air ventilation systems which would reduce formaldehyde levels. (*Id.*, p. 13.) Since the SCEA does not analyze this impact at all, none of these or other mitigation measures have been considered.

When a Project exceeds a duly adopted CEQA significance threshold, as here, this alone establishes substantial evidence that the project will have a significant adverse environmental impact. Indeed, in many instances, such air quality thresholds are the only criteria reviewed and treated as dispositive in evaluating the significance of a project's air quality impacts. (*See, e.g. Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 960 [County applies Air District's "published CEQA quantitative criteria" and "threshold level of cumulative significance"]; *see also Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 110-111 ["A 'threshold of significance' for a given environmental effect is simply that level at which the lead agency finds the effects of the project to be significant"].)

The California Supreme Court made clear the substantial importance that an air district significance threshold plays in providing substantial evidence of a significant adverse impact. (*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 Coll. of San Mateo Gardens v. San Mateo Cty. Cmty. Coll. Dist.* (2016) 1 Cal.5th 937, 958 [emphasis added].) As a result, the City must address this impact and identify enforceable mitigation measures prior to

approving the SCEA. (*See* Pub. Res. Code § 21155.2(b)(5) [SCEA must mitigate all impacts to level of insignificance].)

The failure of the SCEA to address the Project's formaldehyde emissions is contrary to the California Supreme Court's decision in *California Building Industry Ass'n v. Bay Area Air Quality Mgmt. Dist.* (2015) 62 Cal.4th 369, 386 ("CBIA"). In that case, the Supreme Court expressly holds that potential adverse impacts to future users and residents from pollution generated by a proposed project ***must be addressed*** under CEQA. At issue in *CBIA* was whether the Air District could enact CEQA guidelines that advised lead agencies that they must analyze the impacts of adjacent environmental conditions on a project. The Supreme Court held that CEQA does not generally require lead agencies to consider the environment's effects on a project. (*CBIA*, 62 Cal.4th at 800-01.) However, to the extent a project may exacerbate existing environmental conditions at or near a project site, those would still have to be considered pursuant to CEQA. (*Id.* at 801.) In so holding, the Court expressly held that CEQA's statutory language required lead agencies to disclose and analyze "impacts on ***a project's users or residents*** that arise ***from the project's effects*** on the environment." (*Id.* at 800 [emphasis added].)

The carcinogenic formaldehyde emissions identified by Mr. Offermann are not an existing environmental condition. Those emissions to the air will be from the Project. People will be residing in and working in the Project's buildings once built and emitting formaldehyde. Once built, the Project will begin to emit formaldehyde at levels that pose significant direct and cumulative health risks. The Supreme Court in *CBIA* expressly finds that this type of air emission and health impact by the project on the environment and a "project's users and residents" must be addressed in the CEQA process. The existing TAC sources near the Project site would have to be considered in evaluating the cumulative effect on future residents of both the Project's TAC emissions as well as those existing off-site emissions.

The Supreme Court's reasoning is well-grounded in CEQA's statutory language. CEQA expressly includes a project's effects on human beings as an effect on the environment that must be addressed in an environmental review. "Section 21083(b)(3)'s express language, for example, requires a finding of a 'significant effect on the environment' (§ 21083(b)) whenever the 'environmental effects of a project will cause substantial adverse effects *on human beings*, either directly or indirectly.'" (*CBIA*, 62 Cal.4th at 800.) Likewise, "the Legislature has made clear—in declarations accompanying CEQA's enactment—that public health and safety are of great importance in the statutory scheme." (*Id.* [citing e.g., PRC §§ 21000, 21001].) It goes without saying that the future residents at the Project are human beings and their health and safety must be subject to CEQA's safeguards.

The City has a duty to investigate issues relating to a project's potential environmental impacts. (*See County Sanitation Dist. No. 2 v. County of Kern*, (2005) 127 Cal.App.4th 1544, 1597–98. ["[U]nder CEQA, the lead agency bears a burden to investigate potential environmental impacts."].) The proposed buildings will have significant impacts on air quality and health risks by emitting cancer-causing levels of formaldehyde into the air that will expose future residents to cancer risks potentially in excess of SCAQMD's threshold of significance for

cancer health risks of 10 in a million. Currently, outside of Mr. Offermann's comments, the City does not have any idea what risks will be posed by formaldehyde emissions from the Project or the residences. As a result, the City must include an analysis and discussion in an EIR which discloses and analyzes the health risks that the Project's formaldehyde emissions may have on future residents and identifies appropriate mitigation measures.

- ii. The SCEA cannot be relied upon to determine the significance of the Project's air quality impacts because the SCEA's air model underestimated the Project's emissions.

SWAPE's review of the SCEA found that it underestimated the Project's emissions and therefore cannot be relied upon to determine the significance of the Project's air quality impacts. The SCEA relies on emissions calculated from the California Emissions Estimator Model Version CalEEMod.2020.4.0 ("CalEEMod"). (Ex. B, p. 3.) This model, which is used to generate a project's construction and operational emissions, relies on recommended default values based on site specific information related to a number of factors (*Id.*, pp. 3-4.) CEQA requires that any changes to the default values must be justified by substantial evidence. (*Id.*, p. 3.)

SWAPE reviewed the Project's CalEEMod output files and found that the values input into the model were inconsistent with information provided in the SCEA. (Ex. B, p. 4.) This results in an underestimation of the Project's emissions. (*Id.*) As a result, the SCEA's air quality analysis cannot be relied upon to estimate the Project's emissions.

Specifically, SWAPE found that the following values used in the SCEA's air quality analysis were either inconsistent with information provided in the SCEA or otherwise unjustified:

1. Failure to Model All Proposed Land Uses. (Ex. B, p. 2.)
2. Unsubstantiated Reduction to Acres of Grading Value. (Ex. B, pp. 3-4.)
3. Unsubstantiated Reductions to Construction Off-Road Equipment Unit Amounts. (Ex. B, pp. 4-5.)
4. Incorrect Application of Construction-Related Mitigation Measures. (Ex. B, pp. 5-7.)

As a result of these errors in the SCEA, the Project's construction and operational emissions are underestimated and cannot be relied upon to determine the significance of the Project's air quality impacts.

- iii. The SCEA inadequately analyzed the Project's impact on human health from emissions of diesel particulate matter.

The SCEA fails to mention or evaluate the Project's construction-related or operational toxic air contaminant ("TAC") emissions. (Ex. B, p. 7.) Instead, the SCEA concluded that the Project would result in a less-than-significant health risk impact without conducting a quantified

construction or operational health risk assessment ("HRA") for Project construction and operation. (*Id.*)

Furthermore, the SCEA concluded that the cancer risk to nearby, sensitive receptors would be less than SCAQMD's significance threshold of 10 in one million because emissions associated with Project operation and construction would be below SCAQMD's localized significance thresholds. However, SWAPE found that the SCEA's analysis of the Project's health risks were inadequate for several reasons. (Ex. B, pp. 8-9.)

First, the SCEA's localized significance threshold ("LST") only assess impacts of pollutants at a local level, and therefore can only evaluate impacts from criteria pollutants. (*Id.*, p. 8.) The LST therefore does not address impacts from diesel particulate matter ("DPM"), and thus, renders the SCEA inadequate.

Second, the SCEA fails to quantitatively evaluate construction-related and operational TACs or make a reasonable effort to connect these emissions to potential health risk impacts to nearby existing sensitive receptors. (Ex. B, pp. 8-9.) SWAPE identifies potential emissions from both the exhaust stacks of construction equipment and daily vehicle trips. (*Id.*) 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. (Ex. B, p. 9; *see also Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 510.)

Third, the California Department of Justice 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, February 2015, *available at*: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.) OEHHA recommends that projects lasting at least 2 months be evaluated for cancer risks to nearby sensitive receptors, a time period which this Project easily exceeds. (Ex. B, p. 9.) The OEHHA document also recommends that if a project is expected to last over 6 months, the exposure should be evaluated throughout the project using a 30-year exposure duration to estimate individual cancer risks. (*Id.*) Based on its extensive experience, SWAPE reasonably assumes that the Project will last at least 30 years, and therefore recommends that health risk impacts from the project be evaluated. (*Id.*) An EIR is therefore required to analyze these impacts. (*Id.*)

Lastly, the SCEA's claim that there will be a less than significant impact without having conducted a qualified construction or operational HRA for nearby sensitive receptors also fails under CEQA requirements. (Ex. B, p. 9.) Thus, an EIR should be prepared to quantify the cumulative excess cancer risk posed by the Project's construction and operation to nearby, existing receptors, and compare it to the SCAQMD threshold of 10 in one million. (*Id.*)

iv. The health risks from construction and operation of the Project exceed

SCAQMD's significance threshold.

SWAPE prepared a screening-level health risk assessment ("HRA") to evaluate potential DPM impacts from the construction and operation of the Project, as opposed to the SCEA's failure to conduct any HRA analysis. (Ex. B, pp. 10-14.) SWAPE used AERSCREEN, the leading screening-level air quality dispersion model. (*Id.* at p. 10.) SWAPE used a sensitive receptor distance of 125 meters and analyzed impacts to individuals at different stages of life based on OEHHA and SCAQMD guidance. (*Id.*, pp. 11-13.)

SWAPE found that the excess cancer risk for infants and children at the closest, sensitive receptor located approximately 125 meters away, over the course of Project construction and operation, is approximately 57.0 and 25.9 in one million. (Ex. B, p. 13.) Moreover, SWAPE found that the excess cancer risk over the course of a residential lifetime is approximately 99.0 in one million. (*Id.*) The infant, child, and lifetime cancer risks exceed the SCAQMD threshold of 10 in one million. (*Id.*, pp. 13-14.) Because a SCEA is only appropriate where all impacts have been mitigated to a level of insignificance, the City must prepare a revised SCEA to mitigate this impact. However, given the substantial evidence of a significant health risk impact from the Project's construction-related and operational emissions, the City should prepare an EIR that includes an HRA.

B. The SCEA's conclusions regarding the Project's noise impacts are not supported by substantial evidence.

The comment of noise expert Deborah Jue is attached as Exhibit C. Ms. Jue has identified several issues with the SCEA. Ms. Jue's concerns are summarized below. (See, Exhibit C.)

After reviewing the proposed Project, SCEA, and related appendices, Ms. Jue concluded that the Project's construction noise impacts are potentially significant for the following reasons and therefore an EIR should be prepared:

- The noise analysis relies on short-term measurements at four locations; these data are not adequate to determine the existing CNEL or range of existing hourly values. The SCEA significance thresholds for noise are based on increases over the ambient. (Table XIII-4, and Appendix G). (Ex. C, p. 1.)
- The SCEA mentions the City of Los Angeles Municipal Code limits on amplified noise (page 5-146), but does not further contain any analysis of the potential impact of music from outdoor amplified sound systems. The SCEA does not appear to include the aggregate effect of sound systems complying with the Municipal Code into a composite noise analysis. Compliance with the municipal codes notwithstanding the noise from music and elevated human voice from active life celebrations are potentially significant and should be discussed in the SCEA. (*Id.*)

- The SCEA cites WHO guidance for interior noise: 45 dBA (events) and 30 dBA Leq, and the SCEA should show that noise from the outdoor event areas will be controlled to comport with these standards. (*Id.*)

Ms. Jue's expert comments constitute substantial evidence of potentially significant construction and operational noise impact as a result of the Project that was not adequately disclosed, analyzed, or mitigated in the IS/MND. Thus, an EIR is required for this Project.

IV. CONCLUSION

For the foregoing reasons, the City should prepare an EIR and recirculate that EIR for public comment prior to any project approvals. We reserve the right to supplement these comments, including but not limited to at public hearings concerning the Project. *Galante Vineyards v. Monterey Peninsula Water Management Dist.*, 60 Cal. App. 4th 1109, 1121 (1997).

Sincerely,

A handwritten signature in cursive script, appearing to read "Victoria Yundt".

Victoria Yundt
LOZEAU DRURY LLP

EXHIBIT A



INDOOR ENVIRONMENTAL ENGINEERING



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Date: May 23, 2022

To: Victoria Yundt
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
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From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: 6521 S. Sepulveda Boulevard Project, Los Angeles, CA
(IEE File Reference: P-4580)

Pages: 18

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 µg/day. The NSRL concentration of formaldehyde that represents a daily dose of 40 µg is 2 µg/m³, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m³, and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 µg/m³. The median indoor formaldehyde concentration was 36 µg/m³, and ranged from 4.8 to 136 µg/m³, which corresponds to a median exceedance of the 2 µg/m³ 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 µg/m³, 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 South Coast Air Quality Management District (SCAQMD, 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 µg/m³ to 28% for the Acute REL of 55 µg/m³.

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 S. Sepulveda Boulevard 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).

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., m² of material/m² floor area, units of furnishings/m² 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 ($\mu\text{g/h}$) from the product of the area-specific formaldehyde emission rate ($\mu\text{g/m}^2\text{-h}$) 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 ($\mu\text{g/unit-h}$) 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., $\mu\text{g/m}^2\text{-h}$) 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 $31 \mu\text{g/m}^2\text{-h}$, 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. $\mu\text{g}/\text{h}$) 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 ($\mu\text{g}/\text{m}^3$) from Equation 1 by dividing the total formaldehyde emission rates (i.e. $\mu\text{g}/\text{h}$) as determined in Step 4, by the design minimum outdoor air ventilation rate (m^3/h) for the IAQ Zone.

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

where:

C_{in} = indoor formaldehyde concentration ($\mu\text{g}/\text{m}^3$)

E_{total} = total formaldehyde emission rate ($\mu\text{g/h}$) into the IAQ Zone.

Q_{oa} = design minimum outdoor air ventilation rate to the IAQ Zone (m^3/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.

According to the Sustainable Communities Environmental Assessment (SCEA), S. Sepulveda Boulevard Project, (CAJA Environmental Services, 2022), the Project is close to roads with moderate to high traffic (e.g., I-405, South Sepulveda Boulevard, South Arizona Avenue, Centinela Avenue, etc.). The SCEA states in Table IV XIII-4 that the existing ambient noise levels range from 50.9 to 68.4 dBA Leq. We note that these short-term measurements, which were conducted on May 13, 2021, are likely lower than pre-pandemic levels, and future levels will likely be significantly higher.

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 Sustainable Communities Environmental Assessment (SCEA), S. Sepulveda Boulevard Project, (CAJA Environmental 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}.

An air quality analysis 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 analysis 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} exceedance concentration of 12 µg/m³, or the National 24-hour average exceedance 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 OEHHA 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.

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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 ft²), 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,

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.

EXHIBIT B



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May 20, 2022

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Subject: Comments on the 6521 S. Sepulveda Boulevard Project (SCH No. 2022040433)

Dear Ms. Yundt,

We have reviewed the March 2022 Sustainable Communities Environmental Assessment ("SCEA") for the 6521 S. Sepulveda Boulevard Project ("Project") located in the City of Los Angeles ("City"). The Project proposes to demolish all existing buildings, with the exception of a 7,760-square-foot ("SF") restaurant, and construct a 365,623-SF mixed-used building, consisting of 362 units and 3,700-SF of restaurant space, as well as 520 parking spaces, on the 2.205-acre site.

Our review concludes that the SCEA fails to adequately evaluate the Project's air quality and health risk impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project are underestimated and inadequately addressed. An Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential air quality and health risk impacts that the project may have on the environment.

Air Quality

Unsubstantiated Input Parameters Used to Estimate Project Emissions

The SCEA's air quality analysis relies on emissions calculated with the California Emissions Estimator Model ("CalEEMod") Version 2020.4.0 (p. IV-13).¹ CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California

¹ "CalEEMod Version 2020.4.0." California Air Pollution Control Officers Association (CAPCOA), March 2022, available at: <http://www.aqmd.gov/caleemod/download-model>.

Environmental Quality Act (“CEQA”) requires that such changes be justified by substantial evidence. Once all of the values are inputted into the model, the Project's construction and operational emissions are calculated, and "output files" are generated. These output files disclose to the reader what parameters are utilized in calculating the Project's air pollutant emissions and make known which default values are changed as well as provide justification for the values selected.

When reviewing the Project’s CalEEMod output files, provided in Appendix B (“AQ & GHG Study”) to the SCEA, we found that several model inputs are not consistent with information disclosed in the SCEA. As a result, the Project’s construction and operational emissions are underestimated. An EIR should be prepared to include an updated air quality analysis that adequately evaluates the impacts that construction and operation of the Project will have on local and regional air quality.

Failure to Model All Proposed Land Uses

Review of the CalEEMod output files demonstrates that the “Sepulveda Centinela – Existing” model includes 9,448-SF of restaurant space (see excerpt below) (Appendix B, pp. 1, 22, 36).

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	23.22	1000sqft	0.53	23,223.00	0
Quality Restaurant	9.45	1000sqft	0.22	9,448.00	0
Parking Lot	63.36	1000sqft	1.45	63,359.00	0

Furthermore, according to the SCEA:

“The Project would retain the majority of the Dinah’s Family Restaurant building, including its character-defining features and materials” (p. 1-1).

As the restaurant building is being preserved, the model should have included the existing restaurant space in the proposed operational model. However, review of the CalEEMod output files demonstrates that the “Sepulveda Centinela – Future” model fails to include the existing 9,448-SF of “Quality Restaurant” (see excerpt below) (Appendix B, pp. 50, 86, 115).

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
High Turnover (Sit Down Restaurant)	3.70	1000sqft	0.00	3,700.00	0
Enclosed Parking with Elevator	210.21	1000sqft	0.00	210,205.00	0
Apartments Mid Rise	362.00	Dwelling Unit	2.04	387,156.00	1035

As demonstrated above, the model fails to include the existing restaurant in the proposed operational model. This omission presents an issue, as CalEEMod includes 63 different land use types that are each assigned a distinctive set of energy usage emission factors.² Thus, by failing to include all proposed land use types, the model may underestimate the Project’s construction-related and operational emissions and should not be relied upon to determine Project significance.

² “Appendix D – Default Data Tables.” California Air Pollution Control Officers Association (CAPCOA), June 2021, available at: <https://www.agmd.gov/caleemod/user's-guide>, p. D-305.

Unsubstantiated Reduction to Acres of Grading Value

Review of the CalEEMod output files demonstrates that the “Sepulveda Centinela – Future” model includes a manual reduction to the default acres of the grading value (see excerpt below) (Appendix B, pp. 51, 87, 116).

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	98.00	2.04

As you can see from the excerpt above, the acres of grading value is reduced by approximately 98%, from the default value of 98- to 2.04-acres. As previously mentioned, the CalEEMod User’s Guide requires any changes to model defaults be justified.³ According to the “User Entered Comments & Non-Default Data” table, the justification provided for this change is:

“Applicant info” (Appendix B, pp. 50, 86, 115).

However, this change remains unsubstantiated as the SCEA and associated documents fail to mention or justify the revised acres of grading value. This is incorrect, as according to the CalEEMod User’s Guide:

“CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, provided that the information is supported by substantial evidence as required by CEQA.”⁴

Here, as the SCEA fails to provide substantial evidence to support the revised acres of grading value, we cannot verify the change. Additionally, the CalEEMod User’s Guide states:

“[T]he dimensions (e.g., length and width) of the grading site have no impact on the calculation, only the total area to be graded. In order to properly grade a piece of land multiple passes with equipment may be required. The acres is based on the equipment list and days in grading or site preparation phase according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday.”⁵

As demonstrated above, the acres of grading value is based on construction equipment and the length of the grading and site preparation phases. Thus, as the dimensions of the Project site have no impact on the acres of grading value, the reduction remains unsupported.

This unsubstantiated reduction presents an issue, as CalEEMod uses the acres of grading value to estimate the dust emissions associated with grading.⁶ Thus, by including an unsubstantiated reduction

³ “CalEEMod User’s Guide Version 2020.4.0.” California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 1, 14.

⁴ “CalEEMod User’s Guide Version 2020.4.0.” California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 13-14.

⁵ “Appendix A Calculation Details for CalEEMod.” California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <http://www.aqmd.gov/caleemod/user's-guide>, p. 9.

⁶ “Appendix A – Calculation Details for CalEEMod.” California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 9.

to the default acres of grading value, the model may underestimate the Project’s construction-related emissions and should not be relied upon to determine Project significance.

Unsubstantiated Reductions to Construction Off-Road Equipment Unit Amounts

Review of the CalEEMod output files demonstrates that the “Sepulveda Centinela – Future” model includes several changes to the default off-road construction equipment unit amounts (see excerpt below) (Appendix B, pp. 52, 88, 117).

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

As a result of these changes, the model includes the following off-road construction equipment (see excerpt below) (Appendix B, pp. 57, 92-93, 121-122).

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	1	8.00	158	0.38
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Grading	Crawler Tractors	1	8.00	212	0.43
Demolition	Excavators	1	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45

As previously mentioned, the CalEEMod User’s Guide requires any changes to model defaults be justified.⁷ According to the “User Entered Comments & Non-Default Data” table, the justifications provided for these changes are:

“Consultant assumptions” (Appendix B, pp. 50, 86, 115).

⁷ “CalEEMod User’s Guide Version 2020.4.0.” California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user-s-guide>, p. 1, 14.

However, this change remains unsubstantiated as the SCEA and associated documents fail to mention or justify the revised off-road equipment unit amounts whatsoever. As previously mentioned, according to the CalEEMod User's Guide:

"CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, provided that the information is supported by substantial evidence as required by CEQA."⁸

Here, as the SCEA fails to provide substantial evidence to support the revised unit amounts, we cannot verify the changes.

These unsubstantiated reductions present an issue, as CalEEMod uses the off-road construction equipment to calculate the emissions associated with construction.⁹ By including unsubstantiated reductions to the default off-road construction equipment unit amounts, the model may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance.

Incorrect Application of Construction-Related Mitigation Measures

Review of the CalEEMod output files demonstrates that the "Sepulveda Centinela – Future" model includes the following construction-related mitigation measures (see excerpt below) (Appendix B, pp. 58, 93, 122).

3.1 Mitigation Measures Construction

Water Exposed Area
Clean Paved Roads

As a result, the model includes a clean paved road moisture content reduction of 80% (see excerpt below) (Appendix B, pp. 51, 87, 116).

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	80

As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.¹⁰ According to the "User Entered Comments & Non-Default Data" table, the justification provided for these inclusions is:

⁸ "CalEEMod User's Guide Version 2020.4.0." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 13-14.

⁹ "CalEEMod User's Guide Version 2020.4.0." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 32.

¹⁰ "CalEEMod User's Guide Version 2020.4.0." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: <https://www.aqmd.gov/caleemod/user's-guide>, p. 2, 9

“Assumes SCAQMD Rule 403 control efficiency for trackout PM reduction” (Appendix B, pp. 51, 87, 116).

Furthermore, regarding Project compliance with fugitive dust regulations, the SCEA states:

“All projects in the SCAQMD jurisdiction are subject to SCAQMD rules and regulations, including, but not limited to, the following: [..]

- Rule 403 Fugitive Dust: This rule mandates that projects reduce the amount of particulate matter entrained in the ambient air as a result of fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions from any active operation, open storage pile, or disturbed surface area” (p. 5-13).

However, the inclusion of the above-mentioned construction-related mitigation measures remains unsubstantiated for three reasons.

First, the inclusion of the construction-related mitigation measures, based on the Project’s compliance with SCAQMD Rule 403, is unsupported. According to the Association of Environmental Professionals (“AEP”) *CEQA Portal Topic Paper* on mitigation measures:

“By definition, mitigation measures are not part of the original project design. Rather, mitigation measures are actions taken by the lead agency to reduce impacts to the environment resulting from the original project design. Mitigation measures are identified by the lead agency after the project has undergone environmental review and are above-and-beyond existing laws, regulations, and requirements that would reduce environmental impacts.”¹¹

As stated in excerpt above, mitigation measures “are not part of the original project design” and are intended to go “above-and-beyond” existing regulatory requirements. As such, the inclusion of these measures, based solely on SCAQMD Rule 403, is unsubstantiated.

Second, according to the above-mentioned AEP report:

“While not ‘mitigation’, a good practice is to include those project design feature(s) that address environmental impacts in the mitigation monitoring and reporting program (MMRP). Often the MMRP is all that accompanies building and construction plans through the permit process. If the design features are not listed as important to addressing an environmental impact, it is easy for someone not involved in the original environmental process to approve a change to the project that could eliminate one or more of the design features without understanding the resulting environmental impact.”¹²

¹¹ “CEQA Portal Topic Paper Mitigation Measures.” Association of Environmental Professionals (AEP), February 2020, available at: <https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf>, p. 5.

¹² “CEQA Portal Topic Paper Mitigation Measures.” Association of Environmental Professionals (AEP), February 2020, available at: <https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf>, p. 6.

As stated in the excerpt above, project design features (“PDFs”) that are not formally included as mitigation measures may be eliminated from the Project’s design altogether. Thus, as the above-mentioned construction-related measures are not formally included as mitigation measures, we cannot guarantee that they would be implemented, monitored, and enforced on the Project site.

Third, simply because the SCEA references SCAQMD Rule 403 does not justify the inclusion of the above-mentioned construction-related mitigation measures in the model. Specifically, according to SCAQMD Rule 403, Projects can either water unpaved roads 3 times per day, water unpaved roads 1 time per day and limit vehicle speeds to 15 mph or apply a chemical stabilizer (see excerpt below).¹³

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS
Unpaved Roads	(4a) Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR (4b) Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR (4c) Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.

As you can see in the above excerpt, to simply comply with SCAQMD Rule 403, the Project may either water unpaved roads 3 times per day, water unpaved roads 1 time per day and limit vehicle speeds to 15 mph, or apply a chemical stabilizer. Thus, the “Water Exposed Area” and “Clean Paved Roads” measures are not both explicitly required by SCAQMD Rule 403, and therefore should not be included in the model. By incorrectly including several construction-related mitigation measures without properly committing to their implementation, the model may underestimate the Project’s construction-related emissions and should not be relied upon to determine Project significance.

Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated

The SCEA concludes that the Project would have a less-than-significant health risk impact without conducting a quantified construction or operational health risk analysis (“HRA”). Regarding the health risk impacts associated with Project construction, the SCEA states:

“The primary TAC that would be generated by construction activities is diesel PM, which would be released from the exhaust pipes of diesel-powered construction vehicles and equipment. According to SCAQMD methodology, health risks from carcinogenic air toxics such as diesel PM are usually quantified in terms of individual cancer risk, which is the likelihood that a person exposed to concentrations of TACs over a 30-year period every day will contract cancer based on standard risk-assessment methodology. However, the anticipated duration of construction activities associated with the Project’s implementation is only approximately 41 months, and

¹³ “Rule 403. Fugitive Dust.” South Coast Air Quality Management District (SCAQMD), June 2005, *available at*: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf>, p. 403-21, Table 2.

daily diesel PM emissions would vary considerably day by day, and by phase. As shown on Table III-8, the Project's maximum daily PM emissions, which include exhaust PM, would not exceed applicable regional thresholds and LSTs. Given these considerations, TAC emissions from the Project's construction phase would be less than significant" (p. 5-28).

As demonstrated above, the SCEA concludes a less-than-significant health risk impact during Project construction because the Project's maximum particulate matter emissions would be below regional thresholds. Furthermore, regarding the health risk impacts associated with Project operation, the SCEA states:

"As also discussed previously, the Project's operational emissions would not exceed SCAQMD regional significance thresholds or LSTs. Additionally, the Project does not propose typical sources of acutely and chronically hazardous TACs such as industrial manufacturing processes, automotive repair facilities, or warehouse distribution facilities. As a result, the Project's operational phase emissions would not warrant the need for a health risk assessment, and this impact would be less than significant" (p. 5-29).

As demonstrated above, the SCEA concludes a less-than-significant health risk impact during Project operation because the Project would not include land uses that generate substantial amounts of toxic air contaminant ("TAC") emissions. However, the SCEA's evaluation of the Project's potential health risk impacts, as well as the subsequent less-than-significant impact conclusion, is incorrect for four reasons.

First, the SCEA's claim that "the Project's maximum daily PM emissions, which include exhaust PM, would not exceed applicable regional thresholds and LSTs" is insufficient (p. 5-28). The use of an LST analysis to determine the health risk impacts posed to nearby, existing sensitive receptors as a result of the Project's construction-related TAC emissions is incorrect. While the LST method assesses the impact of pollutants at a local level, it only evaluates impacts from criteria air pollutants. According to the *Final Localized Significance Threshold Methodology* document prepared by the SCAQMD, LST analyses are only applicable to NO_x, CO, PM₁₀, and PM_{2.5} emissions, which are collectively referred to as criteria air pollutants.¹⁴ Because the LST method can only be applied to criteria air pollutants, this method cannot be used to determine whether emissions from TACs, specifically DPM, a known human carcinogen, would result in a significant health risk impact to nearby sensitive receptors. As a result, health impacts from exposure to TACs, such as DPM, were not analyzed, thus leaving a gap in the SCEA's analysis.

Second, by failing to prepare a quantified construction and operational HRA, the Project is inconsistent with CEQA's requirement to make "a reasonable effort to substantively connect a project's air quality impacts to likely health consequences."¹⁵ This poses a problem, as construction of the Project would produce DPM emissions through the exhaust stacks of construction equipment over a duration of approximately 41 months (p. 5-26). Furthermore, operation of the Project is expected to generate 1,154

¹⁴ "Final Localized Significance Threshold Methodology." SCAQMD, Revised July 2008, available at: <http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf>.

¹⁵ "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, available at: <https://cegaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf>.

net new daily vehicle trips, which would produce additional exhaust emissions and continue to expose nearby, existing sensitive receptors to DPM emissions (p. 5-156). However, the SCEA fails to evaluate the TAC emissions associated with Project construction and operation or indicate the concentrations at which such pollutants would trigger adverse health effects. Thus, without making a reasonable effort to connect the Project's TAC emissions to the potential health risks posed to nearby receptors, the SCEA is inconsistent with CEQA's requirement to correlate Project-generated emissions with potential adverse impacts on human health.

Third, the Office of Environmental Health Hazard Assessment ("OEHHA"), the organization responsible for providing guidance on conducting HRAs in California, released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments* in February 2015. This guidance document describes the types of projects that warrant the preparation of an HRA. Specifically, OEHHA recommends that all short-term projects lasting at least 2 months assess cancer risks.¹⁶ Furthermore, according to OEHHA:

"Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs (OEHHA, 2009)."¹⁷

Thus, as the Project's anticipated construction duration exceeds the 2-month and 6-month requirements set forth by OEHHA, construction of the Project meets the threshold warranting a quantified HRA under OEHHA guidance and should be evaluated for the entire 32-month construction period. Furthermore, OEHHA recommends that an exposure duration of 30 years should be used to estimate the individual cancer risk at the maximally exposed individual resident ("MEIR").¹⁸ While the SCEA fails to provide the expected lifetime of the proposed Project, we can reasonably assume that the Project would operate for at least 30 years, if not more. Therefore, operation of the Project also exceeds the 2-month and 6-month requirements set forth by OEHHA and should be evaluated for the entire 30-year residential exposure duration, as indicated by OEHHA guidance. These recommendations reflect the most recent state health risk policies, and as such, an EIR should be prepared to include an analysis of health risk impacts posed to nearby sensitive receptors from Project-generated DPM emissions.

Fourth, by claiming a less-than-significant impact without conducting a quantified construction or operational HRA for nearby, existing sensitive receptors, the SCEA fails to compare the Project's excess cancer risk to the SCAQMD's specific numeric threshold of 10 in one million.¹⁹ Thus, in accordance with the most relevant guidance, an assessment of the health risk posed to nearby, existing receptors as a result of Project construction and operation should be conducted.

¹⁶ "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 8-18.

¹⁷ "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 8-18.

¹⁸ "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 2-4.

¹⁹ "South Coast AQMD Air Quality Significance Thresholds." SCAQMD, April 2019, available at: <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf>.

Screening-Level Analysis Demonstrates Significant Impacts

In order to conduct our screening-level risk assessment we relied upon AERSCREEN, which is a screening level air quality dispersion model.²⁰ The model replaced SCREEN3, and AERSCREEN is included in the OEHHA and the California Air Pollution Control Officers Associated (“CAPCOA”) guidance as the appropriate air dispersion model for Level 2 health risk screening assessments (“HRSAs”).^{21, 22} A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

We prepared a preliminary HRA of the Project’s construction and operational health risk impact to residential sensitive receptors using the annual PM₁₀ exhaust estimates from the SCEA’s CalEEMod output files. Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life.²³ The SCEA’s CalEEMod model indicates that construction activities will generate approximately 402 pounds of DPM over the 1,153-day construction period.²⁴ The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project construction, we calculated an average DPM emission rate by the following equation:

$$\text{Emission Rate} \left(\frac{\text{grams}}{\text{second}} \right) = \frac{402.6 \text{ lbs}}{1153 \text{ days}} \times \frac{453.6 \text{ grams}}{\text{lbs}} \times \frac{1 \text{ day}}{24 \text{ hours}} \times \frac{1 \text{ hour}}{3,600 \text{ seconds}} = 0.00193 \text{ g/s}$$

Using this equation, we estimated a construction emission rate of 0.00193 grams per second (“g/s”). Subtracting the 1,153-day construction period from the total residential duration of 30 years, we assumed that after Project construction, the sensitive receptor would be exposed to the Project’s operational DPM for an additional 26.84 years. The SCEA’s operational CalEEMod emissions indicate that operational activities will generate approximately 69 net pounds of DPM per year throughout operation.²⁵ Applying the same equation used to estimate the construction DPM rate, we estimated the following emission rate for Project operation:

$$\text{Emission Rate} \left(\frac{\text{grams}}{\text{second}} \right) = \frac{69.0 \text{ lbs}}{365 \text{ days}} \times \frac{453.6 \text{ grams}}{\text{lbs}} \times \frac{1 \text{ day}}{24 \text{ hours}} \times \frac{1 \text{ hour}}{3,600 \text{ seconds}} = 0.000992 \text{ g/s}$$

²⁰ “AERSCREEN Released as the EPA Recommended Screening Model,” U.S. EPA, April 2011, *available at*: http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf

²¹ “Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, *available at*: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>.

²² “Health Risk Assessments for Proposed Land Use Projects.” CAPCOA, July 2009, *available at*: http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

²³ “Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, *available at*: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 8-18.

²⁴ See Attachment A for health risk calculations.

²⁵ Existing emissions subtracted from operational emissions.

Using this equation, we estimated an operational emission rate of 0.000992 g/s. Construction and operation were simulated as a 2.205-acre rectangular area source in AERSCREEN, with approximate dimensions of 134- by 67-meters. A release height of three meters was selected to represent the height of stacks of operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution. The population of Los Angeles was obtained from U.S. 2020 Census data.²⁶

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project Site. The United States Environmental Protection Agency (“U.S. EPA”) suggests that the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10% in screening procedures.²⁷ According to the SCEA the nearest sensitive receptor is a single-family residence located 350 feet, or roughly 125 meters from the Project site (p. 5-19). Thus, the single-hour concentration estimated by AERSCREEN for Project construction is approximately 1.735 $\mu\text{g}/\text{m}^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.1735 $\mu\text{g}/\text{m}^3$ for Project construction at the MEIR. For Project operation, the single-hour concentration estimated by AERSCREEN is 0.9390 $\mu\text{g}/\text{m}^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.0939 $\mu\text{g}/\text{m}^3$ for Project operation at the MEIR.

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA, as recommended by SCAQMD.²⁸ Specifically, guidance from OEHHA and the California Air Resources Board (“CARB”) recommends the use of a standard point estimate approach, including high-point estimate (i.e. 95th percentile) breathing rates and age sensitivity factors (“ASF”) in order to account for the increased sensitivity to carcinogens during early-in-life exposure and accurately assess risk for susceptible subpopulations such as children. The residential exposure parameters, such as the daily breathing rates (“BR/BW”), exposure duration (“ED”), age sensitivity factors (“ASF”), fraction of time at home (“FAH”), and exposure frequency (“EF”) utilized for the various age groups in our screening-level HRA are as follows:

²⁶ “Los Angeles.” U.S. Census Bureau, 2020, available at: <https://datacommons.org/place/geoid/0644000>.

²⁷ “Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised.” U.S. EPA, October 1992, available at: http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf.

²⁸ “AB 2588 and Rule 1402 Supplemental Guidelines.” SCAQMD, October 2020, available at: <http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19>, p. 2.

Exposure Assumptions for Residential Individual Cancer Risk						
Age Group	Breathing Rate (L/kg-day) ²⁹	Age Sensitivity Factor ³⁰	Exposure Duration (years)	Fraction of Time at Home ³¹	Exposure Frequency (days/year) ³²	Exposure Time (hours/day)
3rd Trimester	361	10	0.25	1	350	24
Infant (0 - 2)	1090	10	2	1	350	24
Child (2 - 16)	572	3	14	1	350	24
Adult (16 - 30)	261	1	14	0.73	350	24

For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor (“CPF”) in units of inverse dose expressed in milligrams per kilogram per day (mg/kg/day⁻¹) to derive the cancer risk estimate. Therefore, to assess exposures, we utilized the following dose algorithm:

$$Dose_{AIR, per\ age\ group} = C_{air} \times EF \times \left[\frac{BR}{BW} \right] \times A \times CF$$

where:

Dose_{AIR} = dose by inhalation (mg/kg/day), per age group
C_{air} = concentration of contaminant in air (µg/m³)
EF = exposure frequency (number of days/365 days)
BR/BW = daily breathing rate normalized to body weight (L/kg/day)
A = inhalation absorption factor (default = 1)
CF = conversion factor (1x10⁻⁶, µg to mg, L to m³)

To calculate the overall cancer risk, we used the following equation for each appropriate age group:

²⁹ “Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics ‘Hot Spots’ Information and Assessment Act.” SCAQMD, October 2020, available at: <http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19>, p. 19; see also “Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>.

³⁰ “Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 8-5 Table 8.3.

³¹ “Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 5-24.

³² “Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments.” OEHHA, February 2015, available at: <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>, p. 5-24.

$$Cancer\ Risk_{AIR} = Dose_{AIR} \times CPF \times ASF \times FAH \times \frac{ED}{AT}$$

where:

Dose_{AIR} = dose by inhalation (mg/kg/day), per age group

CPF = cancer potency factor, chemical-specific (mg/kg/day)⁻¹

ASF = age sensitivity factor, per age group

FAH = fraction of time at home, per age group (for residential receptors only)

ED = exposure duration (years)

AT = averaging time period over which exposure duration is averaged (always 70 years)

Consistent with the 1,153-day construction schedule, the annualized average concentration for construction was used for the entire third trimester of pregnancy (0.25 years), entire infantile stage of life (0 – 2 years), and the first 0.91 years of the child stage of life (2 – 16 years). The annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the latter 13.09 years of the child stage of life and the entire adult stage of life (16 – 30 years). The results of our calculations are shown in the table below.

The Maximally Exposed Individual at an Existing Residential Receptor				
Age Group	Emissions Source	Duration (years)	Concentration (ug/m3)	Cancer Risk
3rd Trimester	Construction	0.25	0.1735	2.36E-06
Infant (0 - 2)	Construction	2	0.1735	5.70E-05
	<i>Construction</i>	<i>0.91</i>	<i>0.1735</i>	<i>4.08E-06</i>
	<i>Operation</i>	<i>13.09</i>	<i>0.0939</i>	<i>3.18E-05</i>
Child (2 - 16)	Total	14		3.59E-05
Adult (16 - 30)	Operation	14	0.0939	3.77E-06
Lifetime		30		9.90E-05

As demonstrated in the table above, the excess cancer risks for the 3rd trimester of pregnancy, infants, children, and adults at the MEIR located approximately 125 meters away, over the course of Project construction and operation, are approximately 2.36, 57.0, 25.9, and 3.77 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years) is approximately 99.0 in one million. The infant, child, and lifetime cancer risks exceed the SCAQMD threshold of 10 in one million, thus resulting in a potentially significant impact not previously addressed or identified by the SCEA.

Our analysis represents a screening-level HRA, which is known to be conservative and tends to err on the side of health protection. The purpose of the screening-level HRA is to demonstrate the potential link between Project-generated emissions and adverse health risk impacts. According to the U.S. EPA:

“EPA’s Exposure Assessment Guidelines recommend completing exposure assessments iteratively using a tiered approach to ‘strike a balance between the costs of adding detail and refinement to an assessment and the benefits associated with that additional refinement’ (U.S. EPA, 1992).

In other words, an assessment using basic tools (e.g., simple exposure calculations, default values, rules of thumb, conservative assumptions) can be conducted as the first phase (or tier) of the overall assessment (i.e., a screening-level assessment).

The exposure assessor or risk manager can then determine whether the results of the screening-level assessment warrant further evaluation through refinements of the input data and exposure assumptions or by using more advanced models.”

As demonstrated above, screening-level analyses warrant further evaluation in a refined modeling approach. Thus, as our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, an EIR should be prepared to include a refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.

A handwritten signature in blue ink that reads "Paul Rosenfeld". The signature is written in a cursive, flowing style.

Paul E. Rosenfeld, Ph.D.

- Attachment A: Health Risk Calculations
- Attachment B: AERSCREEN Output Files
- Attachment C: Matt Hagemann CV
- Attachment D: Paul E. Rosenfeld CV

Construction		
2023		Total
Annual Emissions (tons/year)	0.0511	Total DPM (lbs) 402.620274
Daily Emissions (lbs/day)	0.28	Total DPM (g) 182628.5563
Construction Duration (days)	365	Emission Rate (g/s) 0.001833267
Total DPM (lbs)	102.2	Release Height (meters) 3
Total DPM (g)	46357.92	Total Acreage 2.205
Start Date	1/1/2023	Max Horizontal (meters) 133.59
End Date	1/1/2024	Min Horizontal (meters) 66.80
Construction Days	365	Initial Vertical Dimension (meters) 1.5
2024		Setting Urban
Annual Emissions (tons/year)	0.0753	Population 3,973,278
Daily Emissions (lbs/day)	0.41260274	Start Date 1/1/2023
Construction Duration (days)	366	End Date 2/27/2026
Total DPM (lbs)	151.0126027	Total Construction Days 1153
Total DPM (g)	68499.3166	Total Years of Construction 3.16
Start Date	1/1/2024	Total Years of Operation 26.84
End Date	1/1/2025	
Construction Days	366	
2025		
Annual Emissions (tons/year)	0.0703	
Daily Emissions (lbs/day)	0.385205479	
Construction Duration (days)	365	
Total DPM (lbs)	140.6	
Total DPM (g)	63776.16	
Start Date	1/1/2025	
End Date	1/1/2026	
Construction Days	365	
2026		
Annual Emissions (tons/year)	0.0282	
Daily Emissions (lbs/day)	0.154520548	
Construction Duration (days)	57	
Total DPM (lbs)	8.807671233	
Total DPM (g)	3995.159671	
Start Date	1/1/2026	
End Date	2/27/2026	
Construction Days	57	

Operation	
Emission Rate	
Annual Emissions (tons/year)	0.0345
Daily Emissions (lbs/day)	0.189041096
Total DPM (lbs)	69.00
Emission Rate (g/s)	0.000992466
Release Height (meters)	3
Total Acreage	2.205
Max Horizontal (meters)	133.59
Min Horizontal (meters)	66.80
Initial Vertical Dimension (meters)	1.5
Setting	Urban
Population	3,973,278

Start date and time 05/17/22 16:47:01

AERSCREEN 21112

Sepulveda Centinela - Construction

Sepulveda Centinela - Construction

----- DATA ENTRY VALIDATION -----

METRIC

ENGLISH

** AREADATA **

Emission Rate: 0.183E-02 g/s 0.145E-01 lb/hr

Area Height: 3.00 meters 9.84 feet

Area Source Length: 133.59 meters 438.29 feet

Area Source Width: 66.80 meters 219.16 feet

Vertical Dimension: 1.50 meters 4.92 feet

Model Mode: URBAN

Population: 3973278

Dist to Ambient Air: 1.0 meters 3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u^*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2022.05.17_DinahsSepulveda_AERSCREEN_Construction.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 05/17/22 16:48:27

Running AERMOD

Processing Winter

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Spring

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Summer

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Autumn

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 30

***** WARNING MESSAGES *****

*** NONE ***

FLOWSECTOR ended 05/17/22 16:48:35

REFINE started 05/17/22 16:48:35

AERMOD Finishes Successfully for REFINE stage 3 Winter sector 0

***** WARNING MESSAGES *****

*** NONE ***

REFINE ended 05/17/22 16:48:36

AERSCREEN Finished Successfully

With no errors or warnings

Check log file for details

Ending date and time 05/17/22 16:48:38

Concentration			Distance		Elevation	Diag	Season/Month		Zo sector		Date	
H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O	LEN	Z0	BOWEN	ALBEDO	REF	WS
REF	TA	HT										HT
	0.37984E+01		1.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.42998E+01		25.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.46594E+01		50.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
*	0.48529E+01		67.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.44116E+01		75.00		0.00	20.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.24599E+01		100.00		0.00	20.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.17345E+01		125.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.13187E+01		150.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.10514E+01		175.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.86722E+00		200.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.73309E+00		225.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.63114E+00		250.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.55238E+00		275.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.48869E+00		300.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.43688E+00		325.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0
	310.0	2.0										
	0.39414E+00		350.00		0.00	0.0		Winter		0-360		10011001
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0

310.0	2.0											
0.35814E+00	375.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.32737E+00	400.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.30100E+00	425.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.27816E+00	450.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.25813E+00	475.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.24049E+00	500.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.22488E+00	525.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21088E+00	550.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19832E+00	575.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.18702E+00	600.00	0.00	5.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.17681E+00	625.00	0.00	5.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.16752E+00	650.00	0.00	5.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.15906E+00	675.00	0.00	5.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.15132E+00	700.00	0.00	5.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.14421E+00	725.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.13767E+00	750.00	0.00	0.0		Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.13163E+00	775.00	0.00	0.0		Winter	0-360	10011001					

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.12605E+00		800.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.12086E+00		825.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11602E+00		850.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11150E+00		875.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10728E+00		900.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10332E+00		925.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.99595E-01		950.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.96097E-01		975.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.92806E-01		1000.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.89707E-01		1025.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.86783E-01		1050.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.84020E-01		1075.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.81408E-01		1100.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.78932E-01		1125.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.76585E-01		1150.00		0.00	10.0		Winter	0-360	10011001	
-1.30	0.043										

0.72239E-01	1200.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.70223E-01	1225.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.68542E-01	1250.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.66704E-01	1275.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.64950E-01	1300.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.63274E-01	1325.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.61672E-01	1350.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.60139E-01	1375.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.58670E-01	1400.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.57263E-01	1425.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.55913E-01	1450.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.54617E-01	1475.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.53373E-01	1500.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.52177E-01	1525.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.51026E-01	1550.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.49918E-01	1575.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.48852E-01	1600.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		

310.0	2.0											
0.47825E-01	1625.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.46834E-01	1650.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.45878E-01	1675.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.44956E-01	1700.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.44065E-01	1725.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.43204E-01	1750.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.42372E-01	1775.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.41568E-01	1800.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.40789E-01	1825.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.40036E-01	1850.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.39306E-01	1875.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.38599E-01	1900.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.37914E-01	1924.99	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.37249E-01	1950.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.36605E-01	1975.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.35979E-01	2000.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.35372E-01	2025.00	0.00	5.0	Winter	0-360	10011001						

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.34782E-01		2050.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.34210E-01		2075.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.33653E-01		2100.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.33112E-01		2124.99		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.32586E-01		2150.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.32074E-01		2175.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.31576E-01		2200.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.31091E-01		2225.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.30619E-01		2250.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.30159E-01		2275.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.29711E-01		2300.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.29275E-01		2325.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.28850E-01		2350.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.28435E-01		2375.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.28031E-01		2400.00		0.00	0.0		Winter	0-360	10011001	
-1.30</											

0.27251E-01	2449.99	0.00	25.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.26875E-01	2475.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.26507E-01	2500.00	0.00	15.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.26148E-01	2525.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.25798E-01	2550.00	0.00	25.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.25456E-01	2575.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.25121E-01	2600.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.24794E-01	2625.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.24474E-01	2650.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.24162E-01	2675.00	0.00	25.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.23856E-01	2700.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.23557E-01	2725.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.23264E-01	2750.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.22977E-01	2775.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.22697E-01	2800.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.22422E-01	2825.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.22154E-01	2850.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		

310.0	2.0											
0.21890E-01	2875.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21632E-01	2900.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21380E-01	2925.00	0.00	30.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21132E-01	2950.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20889E-01	2975.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20651E-01	3000.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20418E-01	3025.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20189E-01	3050.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19965E-01	3075.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19745E-01	3100.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19529E-01	3125.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19317E-01	3150.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19109E-01	3175.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.18905E-01	3200.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.18705E-01	3225.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.18508E-01	3250.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.18315E-01	3275.00	0.00	0.0	Winter	0-360	10011001						

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.18125E-01		3300.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17939E-01		3325.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17756E-01		3350.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17576E-01		3375.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17399E-01		3400.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17226E-01		3425.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17055E-01		3450.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16888E-01		3475.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16723E-01		3500.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16561E-01		3525.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16401E-01		3550.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16244E-01		3575.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16090E-01		3600.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15938E-01		3625.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15789E-01		3650.00		0.00	0.0		Winter	0-360	10011001	
-1.30											

0.15498E-01	3700.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.15356E-01	3725.00	0.00	15.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.15216E-01	3750.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.15078E-01	3775.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14943E-01	3800.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14809E-01	3825.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14678E-01	3850.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14548E-01	3875.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14421E-01	3900.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14295E-01	3925.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14172E-01	3950.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14050E-01	3975.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13930E-01	4000.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13811E-01	4025.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13695E-01	4050.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13580E-01	4075.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13467E-01	4100.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		

310.0	2.0											
0.13355E-01	4125.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.13245E-01	4150.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.13137E-01	4175.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.13030E-01	4200.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12925E-01	4225.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12821E-01	4250.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12718E-01	4275.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12617E-01	4300.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12518E-01	4325.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12419E-01	4350.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12322E-01	4375.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12227E-01	4400.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12132E-01	4425.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.12039E-01	4450.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11947E-01	4475.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11856E-01	4500.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11767E-01	4525.00	0.00	0.0	Winter	0-360	10011001						

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11678E-01		4550.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11591E-01		4575.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11505E-01		4600.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11420E-01		4625.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11336E-01		4650.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11253E-01		4675.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11172E-01		4700.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11091E-01		4725.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.11011E-01		4750.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10932E-01		4775.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10854E-01		4800.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10778E-01		4825.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10702E-01		4850.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10627E-01		4875.00		0.00	30.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.10553E-01		4900.00		0.00	5.0		Winter	0-360	10011001	
-1.30											

0.10407E-01	4950.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.10335E-01	4975.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.10265E-01	5000.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						

Start date and time 05/17/22 16:49:27

AERSCREEN 21112

Sepulveda Centinela - Operations

----- DATA ENTRY VALIDATION -----

METRIC

ENGLISH

** AREADATA **

Emission Rate: 0.992E-03 g/s 0.788E-02 lb/hr

Area Height: 3.00 meters 9.84 feet

Area Source Length: 133.59 meters 438.29 feet

Area Source Width: 66.80 meters 219.16 feet

Vertical Dimension: 1.50 meters 4.92 feet

Model Mode: URBAN

Population: 3973278

Dist to Ambient Air: 1.0 meters 3. feet

** BUILDING DATA **

No Building Downwash Parameters

**** TERRAIN DATA ****

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

**** FUMIGATION DATA ****

No fumigation requested

**** METEOROLOGY DATA ****

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u^*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2022.05.17_DinahsSepulveda_AERSCREEN_Operations.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 05/17/22 16:50:32

Running AERMOD

Processing Winter

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Spring

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Summer

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector 30

***** WARNING MESSAGES *****

*** NONE ***

Running AERMOD

Processing Autumn

Processing surface roughness sector 1

Processing wind flow sector 1

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 0

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 2

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 5

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 10

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 15

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 20

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 6

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 25

***** WARNING MESSAGES *****

*** NONE ***

Processing wind flow sector 7

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 30

***** WARNING MESSAGES *****

*** NONE ***

FLOWSECTOR ended 05/17/22 16:50:40

REFINE started 05/17/22 16:50:40

AERMOD Finishes Successfully for REFINE stage 3 Winter sector 0

***** WARNING MESSAGES *****

*** NONE ***

REFINE ended 05/17/22 16:50:41

AERSCREEN Finished Successfully

With no errors or warnings

Check log file for details

Ending date and time 05/17/22 16:50:43

Concentration			Distance		Elevation		Diag	Season/Month		Zo sector		Date		
H0	U*		W*	DT/DZ	ZICNV	ZIMCH	M-O	LEN	Z0	BOWEN	ALBEDO	REF	WS	HT
REF	TA	HT												
	0.20564E+01			1.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.23279E+01			25.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.25225E+01			50.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
*	0.26273E+01			67.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.23883E+01			75.00		0.00	20.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.13317E+01			100.00		0.00	20.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.93903E+00			125.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.71390E+00			150.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.56919E+00			175.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.46950E+00			200.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.39688E+00			225.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.34169E+00			250.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.29905E+00			275.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.26457E+00			300.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.23652E+00			325.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		
310.0	2.0													
	0.21338E+00			350.00		0.00	0.0		Winter		0-360	10011001		
-1.30	0.043	-9.000	0.020	-999.	21.		6.0	1.000	1.50	0.35	0.50	10.0		

310.0	2.0										
0.19389E+00	375.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.17723E+00	400.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.16295E+00	425.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.15059E+00	450.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.13974E+00	475.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.13020E+00	500.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.12175E+00	525.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.11417E+00	550.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.10737E+00	575.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.10125E+00	600.00	0.00	5.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.95720E-01	625.00	0.00	5.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.90694E-01	650.00	0.00	5.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.86114E-01	675.00	0.00	5.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.81923E-01	700.00	0.00	5.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.78073E-01	725.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.74532E-01	750.00	0.00	0.0	Winter	0-360	10011001					
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
0.71264E-01	775.00	0.00	0.0	Winter	0-360	10011001					

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.68238E-01		800.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.65431E-01		825.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.62812E-01		850.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.60366E-01		875.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.58081E-01		900.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.55936E-01		925.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.53919E-01		950.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.52025E-01		975.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.50244E-01		1000.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.48566E-01		1025.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.46983E-01		1050.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.45487E-01		1075.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.44073E-01		1100.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.42732E-01		1125.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.41462E-01		1150.00		0.00	10.0		Winter	0-360	10011001	
-1.30	0.043										

0.39109E-01	1200.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.38018E-01	1225.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.37107E-01	1250.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.36112E-01	1275.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.35163E-01	1300.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.34256E-01	1325.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.33388E-01	1350.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.32558E-01	1375.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.31763E-01	1400.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.31001E-01	1425.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.30271E-01	1450.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.29569E-01	1475.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.28895E-01	1500.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.28247E-01	1525.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.27625E-01	1550.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.27025E-01	1575.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.26448E-01	1600.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		

310.0	2.0											
0.25891E-01	1625.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.25355E-01	1650.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.24838E-01	1675.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.24338E-01	1700.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.23856E-01	1725.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.23390E-01	1750.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.22940E-01	1775.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.22504E-01	1800.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.22083E-01	1825.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21675E-01	1850.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.21280E-01	1875.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20897E-01	1900.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20526E-01	1925.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.20166E-01	1950.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19817E-01	1975.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19478E-01	2000.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.19150E-01	2025.00	0.00	5.0	Winter	0-360	10011001						

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.18831E-01		2050.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.18521E-01		2075.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.18219E-01		2100.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17926E-01		2125.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17641E-01		2150.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17364E-01		2175.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.17095E-01		2200.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16832E-01		2225.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16577E-01		2250.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16328E-01		2275.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.16085E-01		2300.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15849E-01		2325.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15619E-01		2350.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15394E-01		2375.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.15175E-01		2400.00		0.00	0.0		Winter	0-360	10011001	
-1.30											

0.14753E-01	2450.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14550E-01	2475.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14351E-01	2500.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.14156E-01	2525.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13967E-01	2550.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13781E-01	2575.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13600E-01	2600.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13423E-01	2625.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13250E-01	2650.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.13081E-01	2675.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12915E-01	2700.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12753E-01	2725.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12595E-01	2750.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12440E-01	2775.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12288E-01	2800.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.12139E-01	2825.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		
310.0 2.0						
0.11994E-01	2850.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.	6.0 1.000 1.50	0.35	0.50	10.0		

310.0	2.0											
0.11851E-01	2875.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11711E-01	2900.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11575E-01	2925.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11440E-01	2950.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11309E-01	2975.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11180E-01	3000.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.11054E-01	3025.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10930E-01	3050.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10809E-01	3075.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10689E-01	3100.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10572E-01	3125.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10458E-01	3150.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10345E-01	3175.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10235E-01	3200.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10126E-01	3225.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.10020E-01	3250.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.99153E-02	3275.00	0.00	30.0	Winter	0-360	10011001						

1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.98127E-02		3300.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.97118E-02		3325.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.96128E-02		3350.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.95154E-02		3375.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.94198E-02		3400.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.93258E-02		3425.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.92334E-02		3450.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.91426E-02		3475.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.90534E-02		3500.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.89656E-02		3525.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.88793E-02		3550.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.87944E-02		3575.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.87110E-02		3600.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.86288E-02		3625.00		0.00	30.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.85481E-02		3650.00		0.00	0.0		Winter	0-360	10011001	
-											

0.83904E-02	3700.00	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.83134E-02	3724.99	0.00	20.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.82376E-02	3750.00	0.00	15.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.81631E-02	3775.00	0.00	25.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.80897E-02	3800.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.80174E-02	3825.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.79463E-02	3849.99	0.00	15.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.78762E-02	3875.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.78072E-02	3900.00	0.00	15.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.77392E-02	3925.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.76722E-02	3950.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.76063E-02	3975.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.75413E-02	4000.00	0.00	10.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.74773E-02	4025.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.74142E-02	4050.00	0.00	30.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.73520E-02	4075.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	
310.0 2.0						
0.72908E-02	4100.00	0.00	25.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999.	21.	6.0 1.000 1.50	0.35	0.50	10.0	

310.0	2.0											
0.72304E-02	4125.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.71708E-02	4150.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.71121E-02	4175.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.70543E-02	4200.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.69972E-02	4225.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.69410E-02	4250.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.68855E-02	4275.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.68308E-02	4300.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.67768E-02	4325.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.67236E-02	4350.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.66711E-02	4375.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.66192E-02	4400.00	0.00	0.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.65681E-02	4425.00	0.00	5.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.65177E-02	4450.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.64679E-02	4475.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.64188E-02	4500.00	0.00	10.0	Winter	0-360	10011001						
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	
310.0	2.0											
0.63704E-02	4525.00	0.00	10.0	Winter	0-360	10011001						

-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.63225E-02		4550.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.62753E-02		4575.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.62287E-02		4600.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.61827E-02		4625.00		0.00	25.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.61372E-02		4650.00		0.00	20.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.60924E-02		4675.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.60481E-02		4700.00		0.00	15.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.60043E-02		4725.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.59611E-02		4750.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.59185E-02		4775.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.58764E-02		4800.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.58347E-02		4825.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.57936E-02		4850.00		0.00	5.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.57530E-02		4875.00		0.00	0.0		Winter	0-360	10011001	
-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0
310.0	2.0										
	0.57129E-02		4900.00		0.00	5.0		Winter	0-360	10011001	
-1.30											

0.56341E-02	4950.00	0.00	5.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.			6.0 1.000 1.50		0.35	0.50 10.0
310.0 2.0						
0.55954E-02	4975.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.			6.0 1.000 1.50		0.35	0.50 10.0
310.0 2.0						
0.55572E-02	5000.00	0.00	0.0	Winter	0-360	10011001
-1.30 0.043 -9.000 0.020 -999. 21.			6.0 1.000 1.50		0.35	0.50 10.0
310.0 2.0						



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**Geologic and Hydrogeologic Characterization
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
Industrial Stormwater Compliance
CEQA Review**

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.

B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist

California Certified Hydrogeologist

Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014, 2017;
- Senior Environmental Analyst, Komex H₂O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt’s responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt’s duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, *Oxygenates in Water: Critical Information and Research Needs*.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.

- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Colorado.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal representatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukunaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Clean up at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.



Technical Consultation, Data Analysis and
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SOIL WATER AIR PROTECTION ENTERPRISE

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Paul Rosenfeld, Ph.D.

Principal Environmental Chemist

Chemical Fate and Transport & Air Dispersion Modeling

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex H₂O Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health*. 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. *Journal of Real Estate Research*. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.**, Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermid and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

Rosenfeld, P.E. & Feng, L. (2011). *The Risks of Hazardous Waste*. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries*. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution*, 123 (17), 319-327.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

Rosenfeld, P.E., J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

Rosenfeld, P. E., M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities*. Boston Massachusetts: Elsevier Publishing

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004*. New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellev, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS-6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

Rosenfeld, P.E., and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

Rosenfeld, P.E., and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

Rosenfeld, P.E., and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld**. (1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

Rosenfeld, P. E. (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

Rosenfeld, P. E. (1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

Presentations:

Rosenfeld, P.E., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society*. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International*

Conferences on Soils Sediment and Water. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The 23rd *Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.**, Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.**, Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants..* Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference*. Lecture conducted from Indianapolis, Maryland.

Rosenfeld. P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation*. Lecture conducted from Anaheim California.

Rosenfeld. P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest*. Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell*. Lecture conducted from Seattle Washington.

Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest*. Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. \$41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: \$10,000 grant awarded to San Diego State University. Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. \$100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. \$20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: \$10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: \$15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. \$500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 5-14-2021
Trial, October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty, Plaintiff vs. Consolidated Rail Corporation and National Railroad Passenger Corporation
d/b/a AMTRAK,
Case No.: No. 18-L-6845
Rosenfeld Deposition, 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe, Plaintiff vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA
Rail, Defendants
Case No.: No. 17-cv-8517
Rosenfeld Deposition, 5-25-2021

In the Superior Court of the State of Arizona In and For the Cuntly of Maricopa
Mary Tryon et al., Plaintiff vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case Number CV20127-094749
Rosenfeld Deposition: 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al *Plaintiffs*, vs. CNA Insurance Company et al.
Case Number 1:17-cv-000508
Rosenfeld Deposition: 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, *Plaintiff*, vs. Marathon Petroleum, LP, *Defendant*.
Case No.: 1716-CV10006
Rosenfeld Deposition. 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs*, vs. United States Metals Refining Company et. al. *Defendant*.
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs*, vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS “Conti Perdido”
Defendant.
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case No.: 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No.: 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case: No 1:19-cv-00315-RHW
Rosenfeld Deposition, 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs*, vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action NO. 14-C-30000
Rosenfeld Deposition, June 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant*.
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs*, vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., *Plaintiffs*, vs. International Paper Company, *Defendant*.
Civil Action Number 2:09-cv-232-WHA-TFM
Rosenfeld Deposition: July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jaeanette Moss Anthony, et al., *Plaintiffs*, vs. Drummond Company Inc., et al., *Defendants*
Civil Action No. CV 2008-2076
Rosenfeld Deposition: September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., *Plaintiffs*, vs. Citgo Petroleum Corporation, et al., *Defendants*.
Case Number 2:07CV1052
Rosenfeld Deposition: July 2009

EXHIBIT C



July 18, 2022

Ms. Victoria Yundt
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
Oakland, California 94612

SUBJECT: Dinah's Sepulveda, Comments on the SCEA document

Dear Ms. Yundt,

Following are brief comments on potential issues in the SCEA document for the subject matter project, Dinah's Sepulveda. The Proposed Project would result in the demolition and removal of existing buildings, with the exception of historic structure (Dinah's Family Restaurant) and development of an 8 story MFR with very low income goals with ground floor restaurant. The noise and vibration analysis is summarized in Section 5.XIII of the SCEA and the backup noise calculations provided in Appendix G.

The noise analysis relies on short-term measurements at four locations; these data are not adequate to determine the existing CNEL or range of existing hourly values. The SCEA significance thresholds for noise are based on increases over the ambient. (Table XIII-4, and Appendix G).

The SCEA mentions the City of Los Angeles Municipal Code limits on amplified noise (page 5-146), but does not further contain any analysis of the potential impact of music from outdoor amplified sound systems. The SCEA does not appear to include the aggregate effect of sound systems complying with the Municipal Code into a composite noise analysis. Compliance with the municipal codes notwithstanding the noise from music and elevated human voice from active life celebrations are potentially significant and should be discussed in the SCEA.

The SCEA cites WHO guidance for interior noise: 45 dBA (events) and 30 dBA Leq, and the SCEA should show that noise from the outdoor event areas will be controlled to comport with these standards

Please feel free to contact me with any questions on this information.

Very truly yours,

WILSON IHRIG

Deborah A. Jue, INCE-USA
Principal

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