ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037
TEL: (650) 589-1660
FAX: (650) 589-5062
amcguire@adamsbroadwell.com

SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721
TEL: (916) 444-6201
FAX: (916) 444-6209

KEVIN T. CARMICHAEL
CHRISTINA M. CARO
THOMAS A. ENSLOW
KELILAH D. FEDERMAN
RICHARD M. FRANCO
ANDREW J. GRAF
TANYA A. GULESSERIAN
DARION N. JOHNSTON
RACHAEL E. KOSS
AIDAN P. MARSHALL
ALAURA R. McGUIRE
ISABEL TAHIR

*Of Counsel*
DANIEL L. CARDOZO
MARC D. JOSEPH

August 19, 2025

**Via Email and Overnight Mail**
City of Antioch Planning Commission
Kevin Riley, Chair
Seth Webber, Vice-Chair
Commissioners Jennifer Perez,
Robert Martin, Ramesh Suman,
Cortney L. Jones
City of Antioch
200 H Street
Antioch, CA 94531
**Email:** planning@antiochca.gov

**Via Email Only**
Kevin Scudero, Acting Director
Community Development Department
200 H Street
Antioch, CA 94531
**Email:** planning@antiochca.gov

Zoe Merideth, Senior Planner
**Email:** zmerideth@antiochca.gov

**Re: Antioch Planning Commission Hearing, Agenda Item 6-2; Slatten Ranch Townhomes Project (TM-01, AR-23-01)**

Dear Chair Riley, Vice-Chair Webber, Commissioners, Mr. Scudero, and Ms. Merideth:

We are writing on behalf of Contra Costa Residents for Responsible Development ("Contra Costa Residents") to provide comments on Agenda Item 6-2, the Slatten Ranch Townhomes Project (TM-01, AR-23-01) ("Slatten Ranch Project" or "Project") proposed by DeNova Homes, Inc. ("Applicant"). The Project consists of a vesting tentative map to create 17 residential lots of 17 three-story buildings, containing 129 townhome-style condominium homes.[1] The Project site is a 6.41 acre site located on the east side and northern end of Slatten Ranch Road, bounded by Wicklow Way on the south and Empire Avenue on the east in the City of Antioch

[1] City of Antioch, Slatten Ranch Townhomes Section 15183 Consistency Memorandum, p. 2.

("City").[2] The Staff Report claims that the Project is exempt from further CEQA review pursuant to CEQA Guidelines Section 15183 because it was adequately analyzed by the Antioch Housing, Environmental hazards, and Environmental Justice Elements Project Environmental Impact Report ("Housing Element EIR").[3] As such, the Staff Report asks the Commission to recommend that the City Council approve the Project's Vesting Tentative Subdivision Map ("VTSM"), and Design Review ("DR").[4]

On July 15, 2025, Contra Costa Residents submitted comments, supported by expert evidence, explaining that the Project is likely to result in peculiar impacts that were not identified or analyzed in the Housing Element EIR or the 15183 Consistency Memorandum, thereby requiring preparation of a full EIR. Specifically, Contra Costa Residents' expert reports included evidence demonstrating that the Project may result in potentially significant and peculiar impacts on air quality, public health, transportation, and noise. Our transportation expert determined that the Project will likely cause significant vehicle miles traveled ("VMT") impacts, which were improperly screened from a full analysis. Additionally, the City failed to analyze noise impacts specific to the Project, while our noise expert identified significant construction noise and vibration impacts that are unique to the Project site and were not addressed in the Housing Element EIR. Finally, neither the Consistency Memorandum nor the Housing Element EIR included emissions modeling to assess Project-specific air quality and public health impacts.

The Commission's Staff Report includes responses to these comments ("Responses").[5] However, the City's responses fail to resolve the deficiencies in the Project's impact analysis. As discussed in detail below, the Project will result in significant, site-specific air quality, public health, transportation, and noise impacts that were not previously analyzed in the Housing Element EIR. In addition, the City has failed to provide substantial evidence demonstrating that Housing Element policies and/or standards will substantially mitigate these Project-specific impacts. These comments are supported by additional expert evidence. Contra Costa Residents' air quality and public health experts Matt Hagemann, P.G., C.Hg, and Paul Rosenfeld, Ph.D. of Soil Water Air Protection Enterprises ("SWAPE"),

---

[2] *Id.*
[3] City of Antioch, Slatten Ranch Townhomes Staff Report to the Antioch Planning Commission Regular Meeting of August 2025 ("Slatten Staff Report"), p. 10, available at: https://www.antiochca.gov/fc/government/agendas/PC/staff-reports/082025-6-2.pdf.
[4] Slatten Staff Report, p. 1.
[5] Slatten Staff Report, Attachment D p. D37.

provide substantial evidence demonstrating that the Project will have peculiar air quality and public health impacts from construction-related diesel particulate matter ("DPM") emissions that the Housing Element EIR did not address.[6] Contra Costa Residents' noise consultant, Jack Meighan, demonstrates that the City lacks substantial evidence to conclude that the Project's noise levels will not exceed General Plan policies or result in peculiar noise impacts because it failed to conduct a noise attenuation study.[7] Contra Costa Residents' transportation consultant, Norm Marshall, provides substantial evidence that the Project was improperly screened from a full VMT analysis and that the City lacks substantial evidence to conclude the Project will not result in site-specific VMT impacts that were not addressed in the Housing Element EIR.[8]

The City has failed to provide substantial evidence demonstrating that the Project will not result in significant site-specific environmental impacts. Contra Costa Residents' expert consultants have also provided substantial evidence that the Project will result in significant impacts that neither the Housing Element EIR nor the 15183 Consistency Memorandum addressed. As a result, the Project is not exempt from further CEQA review and the City must prepare an EIR that analyzes all of the Project's potentially significant environmental impacts before the Commission may consider approving the Project or its entitlements.

## I. STATEMENT OF INTEREST

Contra Costa Residents is an unincorporated association of individuals and labor organizations that may be adversely affected by the potential public and worker health and safety hazards, and the environmental and public service impacts of the Project. The coalition includes the International Brotherhood of Electrical Workers Local 302, Plumbers & Steamfitters Local 159, Sheet Metal Workers Local 104, Sprinkler Fitters Local 483, along with their members, their families, and other individuals who live and work in the City of Antioch and Contra Costa County.

---

[6] See **Exhibit A,** SWAPE, Comments on Slatten Ranch 8.20 Planning Commission Hearing Staff Report (August 18, 2025) ("SWAPE Comments").
[7] See **Exhibit B,** Jack Meighan, Comments on Slatten Ranch 8.20 Planning Commission Hearing Staff Report (August 18, 2025) ("Meighan Comments").
[8] See **Exhibit C,** Norm Marshall, Comments on Slatten Ranch 8.20 Planning Commission Hearing Staff Report (August 18, 2025) ("Marshall Comments").

Contra Costa Residents' individual members live, work, recreate, and raise their families in the City of Antioch and surrounding communities. Accordingly, they would be directly affected by the Project's environmental, health, and safety impacts. Individual members may also work on the Project itself. They will be first in line to be exposed to any health and safety hazards that exist on site.

Contra Costa Residents also has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for businesses and industries to expand in the region, and by making the area less desirable for new businesses and new residents. Indeed, continued environmental degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities.

## II. THE PROJECT INVOLVES POTENTIALLY SIGNIFICANT OR PECULIAR IMPACTS THAT PRECLUDE RELIANCE ON CEQA GUIDELINES SECTION 15183 EXEMPTION

CEQA Guidelines Section 15183 provides an exemption for projects which are consistent with the development density established by existing zoning, community plan or general plan policies for which an EIR was certified, *except as necessary to evaluate whether there are project-specific significant impacts which are peculiar to the project or project site.*[9] In relying on section 15183 to approve a project, a lead agency may not forgo further analysis of potentially significant impacts unless it makes certain findings. An agency is required to perform further analysis as to impacts that (1) are peculiar to the proposed project or parcel, (2) were not analyzed as significant effects in a prior EIR for the zoning, community or general plan with which the project is consistent, (3) are potentially significant off-site or cumulative impacts that were not discussed in the prior EIR, or (4) are previously identified significant impacts which, due to substantial new information not known at the time the EIR was certified, are determined to have a more severe impact than discussed in the prior EIR.[10]

Under section 15183(f), an effect of a project on the environment is not considered peculiar to the project or project site if "uniformly applied development policies or standards have been previously adopted …with a finding that the

[9] 14 CCR § 15183(a).
[10] 14 CCR § 15183(b)(1)-(4).

development policies or standards will substantially mitigate the environmental effect when applied to future projects, unless substantial new information shows that the policies or standards will not substantially mitigate the environmental effect."[11]

Agency determinations under Guidelines section 15183 are reviewed under the substantial evidence standard.[12] In determining whether an agency's findings concerning the use of a statutory exemption from CEQA may be upheld, courts review the administrative record to see that substantial evidence supports each element of the exemption.[13] This includes the determination that "uniformly applied development policies or standards" will substantially mitigate the project's environmental effects.[14] Agency findings must specifically address the effect of uniform policies and standards on potential environmental impacts.[15]

In addition, CEQA Guidelines section 15168's two-step inquiry of a program EIR's applicability to later activities holds that "if a later activity would have effects that were not examined in the program EIR, a new initial study would need to be prepared leading to either an EIR or a negative declaration." The City insists that, pursuant to sections 15162 and 15183, the Project is within the scope of the program EIR and no subsequent EIR is required. "Whether a later activity is within the scope of a program EIR is a factual question that the lead agency determines based on substantial evidence in the record."[16]

Contra Costa Resident's previous comments explained that the 15183 Consistency Memo failed to examine several of the Project's significant impacts related to air quality, health risks, transportation, and noise that were not analyzed in the Housing Element EIR and are thus peculiar to the proposed Project. In response to these comments, the City revised its 15183 Consistency Memorandum and now reasserts that the Project would not result in any significant or peculiar environmental impacts that require the preparation of an EIR.

---

[11] 14 CCR § 15183(f).
[12] *Lucas v. City of Pomona* (2023) 92 Cal.App.5th 508, 538, citing *Concerned Dublin Citizens v. City of Dublin* (2103) 214 Cal.App.4th 1301, 1311; see also, *Hilltop Group v. County of San Diego* (2024) 99 Cal.App.5th 890, 909-10.
[13] *Lucas*, 92 Cal.App.5th at 538.
[14] 14 CCR § 15183(f).
[15] *Hilltop Group*, 99 Cal.App.5th at 918.
[16] CEQA Guidelines § 15168.

The City's response fails to address the concerns in Contra Costa Residents' comments, and its conclusion that the Project will not result in significant and peculiar impacts is not supported by substantial evidence. As the comments below demonstrate, there is substantial evidence that the Project will result in significant and peculiar impacts to air quality, public health, transportation, and noise that the Housing Element EIR, and the City's responses, and the revised Consistency Memorandum fail to address. This evidence precludes the City from relying on the CEQA Guidelines Section 15183 exemption to avoid further CEQA review. In order to comply with CEQA, the City must prepare an EIR that analyzes the Project's potentially significant and peculiar impacts.

## A. The Project's Diesel Particulate Matter Emissions Will Have Significant, Unmitigated Air Quality and Public Health Impacts That are More Severe Than Analyzed in The Housing Element EIR

Contra Costa Residents' previous comments demonstrated that the City lacks substantial evidence to conclude that the Project would not result in significant air quality or public health impacts peculiar to the Project or Project site. The Housing Element EIR did not evaluate Project-specific emissions, and the City did not conduct any emissions modeling to assess the potential impacts from the Project's construction or operation.

The City's response continues to ignore potentially significant and site-specific air quality and health risks associated with DPM emissions during construction. In particular, the City failed to prepare a health risk analysis ("HRA"). Contra Costa Residents' air quality experts, SWAPE, conducted a screening-level HRA for the Project[17] and found that the Project would emit approximately 125 pounds of DPM during its 453-day construction period and an additional 20 net pounds annually during operation.[18] Based on these emissions, SWAPE calculated lifetime cancer risks (30 years) of 46.4 in one million, with age-specific risks of 32.5, 10.1, and 15.6 in one million for infants, children, and adults, respectively.[19] These risks all exceed the Bay Area Air Quality Management District's ("BAAQMD") significance threshold of 10 in one million.[20] These are significant and peculiar air quality and public health risks that were not addressed in the Housing Element

[17] SWAPE Comments, pp. 1-7.
[18] SWAPE Comments, p. 2.
[19] SWAPE Comments, p. 7.
[20] SWAPE Comments, p. 7.

EIR or the City's 15183 Consistency Memo.[21] Because of this, SWAPE explains that a refined HRA should be conducted to adequately and accurately evaluate the Project's potential health risks from DPM emissions.[22]

The City also fails to provide substantial evidence demonstrating that the Project's DPM emissions will be reduced to less-than-significant levels. The City has not identified or committed to any Project-specific mitigation measures to address these emissions. Instead, the City asserts that general compliance with existing air quality regulations is sufficient to avoid significant impacts. As SWAPE explains, if the City's refined HRA finds that the Project would not result in significant health risk impacts, then mitigation measures should be incorporated to reduce DPM emissions to the greatest extent feasible, as required by CEQA.[23] SWAPE goes on to identify several feasible, cost-effective mitigation measures that the City could implement to substantially reduce DPM emissions.[24]

There is substantial evidence that the Project will result in significant and site-specific air quality and health risk impacts. These impacts were not addressed in the Housing Element EIR or the City's 15183 Consistency Memorandum. The City has also failed to propose any DPM specific mitigation measures or provide any evidence to demonstrate that impacts from DPM emissions will be mitigated to the greatest extent feasible. Accordingly, the City cannot rely on the CEQA Section 15183 exemption. The City must prepare an EIR that evaluates the Project-specific, significant air quality and health risk impacts and proposes mitigation measures that will reduce impacts to the greatest extent feasible, as required by CEQA.

### B. The Project Will Have Significant, Unmitigated Noise Impacts That are More Severe Than Analyzed in The Housing Element EIR

Contra Costa Residents' and its noise expert's previous comments demonstrated that the City lacks substantial evidence to conclude that the Project will not result in significant and peculiar noise impacts to existing sensitive receptors. The City failed to conduct any site-specific noise analysis to evaluate the Project's potential to generate excessive construction noise or vibration. Our noise expert also provided substantial evidence showing that the Project is likely to result

[21] SWAPE Comments, p. 7.
[22] *Id.*
[23] *Id.*
[24] SWAPE Comments, p. 8.

in significant construction and vibration impacts that are peculiar to the Project-site.

In response, the City claims that the Project's noise impacts will not be peculiar because construction noise would be mitigated through compliance with the City of Antioch Code of Ordinance and General Plan policies. Specifically, the City asserts that compliance with General Plan Policy 11.8.2 ("Policy") will substantially mitigate impacts. But, the City also claims that the Project does not need to prepare a noise attenuation study—as required under subsection (f) of the Policy—because "the City has determined that the Project would not result in a significant increase in noise and because the project is not located in an area exceeding the General Plan noise standards.[25] This response is inadequate, unsupported, and misrepresents the housing Element EIR's own findings.

The Housing Element EIR explicitly states that "[i]ndividual housing developments proposed under the Project would result in a potentially significant impact if they cause a new exceedance of the General Plan noise objectives, or an audible (3.0 dBA) increase in noise in areas where the General Plan noise objectives are already exceeded as the result of existing development…."[26] In such cases, "General Plan Policy 11.8.2(f) requires a detailed noise attenuation study to be prepared by a qualified acoustical engineer to determine appropriate mitigation and ways to incorporate such mitigation into project design and implementation."[27] Yet the City has provided no analysis to determine whether either of these conditions apply to the Project.[28] Instead, it simply asserts, without baseline noise measurements or supporting data, that the Project would not trigger these thresholds.[29]

As Mr. Meighan explains, site-specific baseline noise measurements are essential to determining whether the Project will exceed General Plan noise thresholds or cause a significant increase in ambient noise.[30] Site-specific noise levels vary significantly based on factors such as surrounding land uses, topography, traffic patterns, and building design.[31] Absent this data, the City lacks the substantial evidence necessary to determine whether the Project will comply

[25] Slatten Staff Report, Attachment D, p. D77.
[26] Housing Element EIR, p. IV.L-10.
[27] Housing Element EIR, p. IV.L-13.
[28] Meighan Comments, p. 1.
[29] Meighan Comments, p. 1.
[30] Meighan Comments, p. 1.
[31] *Id.*

with General Plan noise standards, and therefore cannot justify its conclusion that a noise attenuation study is not necessary.[32]

Moreover, Mr. Meighan's previous comments provided substantial evidence that the project may result in significant construction-related noise and vibration impacts. The City has failed to provide any evidence to rebut this analysis. Instead, it relies solely on the assertion that compliance with the City of Antioch Code of Ordinances and General Plan policies will be sufficient to reduce noise impacts to less-than-significant levels. While the Housing Element EIR generally found that compliance with these standards could mitigate impacts, the City has not demonstrated that it is complying with these policies. Specifically, it has failed to prepare the noise attenuation study required by Policy 11.8.2(f), nor has it provided any site-specific analysis or data to justify its conclusion that the study is unnecessary. Without this, the City lacks substantial evidence to support its determination that the Project's noise impacts will not be significant or peculiar to the site.

Because the City has failed to demonstrate—based on substantial evidence—that the Project will not result in significant and peculiar noise impacts, it cannot rely on CEQA Guidelines Section 15183 exemption. The City must prepare an EIR that includes an analysis of the Project-specific noise impacts.

### C. The City Lacks Substantial Evidence to Conclude That the Project Will Not Result in Peculiar and Significant VMT Impacts

Contra Costa Residents' previous comments made clear that the City's failure to perform a quantitative Vehicle Miles Traveled ("VMT") analysis violates Mitigation Measure TRANS-1 ("TRANS-1") of the Housing Element EIR. Without this analysis, the City cannot determine the extent to which the Project exceeds VMT significance thresholds, nor can it identify the type or effectiveness of mitigation required to reduce impacts to a less-than-significant level. The City's claim that a full VMT analysis is unnecessary was based on circular reasoning and lacked substantial evidence to demonstrate that the Project would not have impacts peculiar to the Project or Project site as required by CEQA Guidelines Section 15183.

In response to these comments, the City revised the 15183 Consistency Memorandum to acknowledge that TRANS-1 applies to the Project. However, the

[32] *Id.* at pp. 1-2.

City fails to adequately address Contra Costa Residents' or Mr. Marshall's concerns.[33] The City still fails to conduct the required quantitative VMT analysis, instead deferring it until after Project approval by including it as a Condition of Approval ("COA"). "By deferring environmental assessment to a future date, the conditions run counter to that policy of CEQA which requires environmental review at the earliest feasible stage in the planning process."[34] This approach also directly contradicts TRANS-1, which clearly states that "[i]ndividual housing project development proposals that do not screen out from VMT impact analysis shall provide a quantitative VMT analysis."[35] The City's justification—that TRANS-1 itself operates as a uniformly applicable development standard capable of substantially mitigating the Project's impacts—is a misreading of the Housing Element EIR. The Housing Element EIR explicitly acknowledges that it did not evaluate VMT impacts at the project level, stating:

> "While Mitigation Measure TRANS-1 could reduce impacts to a less-than-significant level, the effectiveness of the above measures in reducing an individual project's VMT impact to a less-than-significant level cannot be determined in this analysis."[36]

The City specifically recognizes that the proposed Project does not screen out from VMT analysis.[37] Therefore, the City is required to conduct a full, Project-specific quantitative VMT analysis *before* Project approval. Deferring this analysis violates the clear terms of TRANS-1 and precludes the City from relying on the CEQA Guidelines Section 15183 exemption, as it lacks substantial evidence to conclude that the Project would not result in significant and peculiar impacts.

Further compounding the issue, the City's COA only requires that the Project reduce VMT "to the maximum extent feasible, in light of project objectives and the nature of the project, to the satisfaction of the Community Development Department."[38] This unlawfully weakens the language of TRANS-1, which states that "Projects which result in a significant impact shall include travel demand management measures and physical measures to *reduce VMT to a less-than-significant level*."[39] Also, this condition violates CEQA by precluding public review

[33] Marshall Comments, pp. 1-4.
[34] *Sundstrom v. County of Mendocino* (1998) 202 Cal.App.3d 296, 305.
[35] Housing Element EIR, p. IV.B-27; Marshall Comments, p. 2.
[36] Housing Element EIR, p. IV.B-30.
[37] Slatten Staff Report, Attachment D, p. D75.
[38] Slatten Staff Report, Attachment D, p. D75.
[39] Housing Element EIR, p. IV.B-27 (emphasis added); Marshall Comments, p. 3.

and prevents the Planning Commission from making a fully informed decision regarding the Project's impacts. Instead, it allows a post-approval determination of the Project's impacts and the efficacy of any mitigation measures by an unidentified person in the City's Community Development Department.[40]

Moreover, by deferring the VMT analysis and mitigation to a post-approval phase, the City violates CEQA's requirements for tiered review and mitigation of previously identified significant and unavoidable impacts. In *Communities for a Better Env't v. California Resources Agency*, the court held that when a lead agency approves a subsequent project with significant unavoidable impacts, it cannot rely solely on a previously adopted statement of overriding considerations.[41] Instead, it must adopt a new, Project-specific statement of overriding considerations at the time of approval.[42] Accordingly, by failing to conduct the required VMT analysis, the City also sidesteps its obligation to adopt a new statement of overriding considerations for those potentially significant and unavoidable impacts.

Therefore, the City fails to adequately address Contra Costa Residents' previous comments or provide substantial evidence to demonstrate that the Project will not result in significant site-specific VMT impacts. Accordingly, the City cannot rely on the CEQA Guidelines Section 15185 exemption and must prepare an EIR.

## III. THE CITY LACKS SUBSTANTIAL EVIDENCE TO MAKE THE REQUIRED FINDINGS TO APPROVE THE PROJECTS ENTITLEMENTS

The Project requires the City to approve a VTSM for condominium purposes that would subdivide the project site for the development of 17 townhome buildings, containing a total of 129 residential units.[43] However, as discussed above, the City has failed to adequately address Contra Costa Residents' previous comments and thus still fails to adequately analyze or mitigate several new Project-specific environmental impacts that were not addressed by the Housing Element EIR. As a result, the City cannot make the requisite findings to approve the Project's VTSM.

California's Subdivision Map Act precludes the approval of a tentative map where the design or improvement of the proposed subdivision is not consistent with

---

[40] Slatten Staff Report, Attachment D, p. D75; Marshall Comments, p. 3.
[41] *Communities for a Better Env't v. California Resources Agency* (2002) 103 CA4th 98, 124.
[42] *Id.*
[43] Slatten Staff Report, p. 1.

the applicable general plan, is likely to cause substantial environmental damage, or is likely to cause serious public health problems.[44]

Additionally, Antioch Municipal Code Section 9-4.323 states that a VTSM may be made conditional or denied if any of the following is determined:

- A failure to do so would place the residents of the subdivision or the immediate community, or both, in a condition dangerous to their health or safety, or both; or

- The condition or denial is required in order to comply with state or federal laws.

As detailed in our comments and those of our experts, there is substantial evidence that the Project may result in several potentially significant environmental impacts peculiar to the Project, including: (1) construction noise and vibration, (2) VMT, and (3) air quality and related health risks. These impacts remain unaddressed and could pose serious risks to public health and safety—both for future subdivision residents and the surrounding community. Therefore, the City cannot make the required findings under the Subdivision Map Act and Antioch's Municipal Code to approve the VTSM until all of the Project's potentially significant impacts are thoroughly analyzed and effectively mitigated.

## IV. CONCLUSIONS

As discussed herein, the City lacks substantial evidence to rely on a CEQA Guidelines Section 15183 exemption for Project approval. The Project will result in potentially significant impacts which are peculiar to the Project and Project site and will require mitigation. Therefore, the Commission cannot approve the Project until the City complies with CEQA by preparing an EIR.

Sincerely,

Alaura McGuire

Attachments
ARM:acp

[44] Government Code § 66474(b), (e) and (f).

# EXHIBIT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

Matt Hagemann, P.G, C.Hg.
(949) 887-9013
mhagemann@swape.com

Paul E. Rosenfeld, PhD
(310) 795-2335
prosenfeld@swape.com

August 19, 2025

Alaura McGuire
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd #1000
South San Francisco, CA 94080

**Subject: Comments on the Slatten Ranch Townhomes Project**

Dear Ms. McGuire,

We have reviewed the February 2024 Consistency Memorandum ("Memo") and the Staff Report for the August 20, 2025, Planning Commission meeting for the Slatten Ranch Townhomes Project ("Project") located in the City of Antioch ("City"). The Project proposes to construct 129 residential units on a 6.41-acre site.

Our review concludes that the Memo fails to adequately evaluate the Project's health risk impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project may be underestimated and inadequately addressed. A full CEQA analysis should be prepared to adequately assess and mitigate the potential health risk impacts that the Project may have on the environment.

# Air Quality

## Screening-Level Analysis Demonstrates Potentially Significant Health Risk Impact

In order to conduct our screening-level risk assessment we relied upon AERSCREEN, which is a screening level air quality dispersion model.[1] AERSCREEN is included in the Office of Environmental Health Hazard Assessment ("OEHHA") and the California Air Pollution Control Officers Associated ("CAPCOA") guidance

[1] "Air Quality Dispersion Modeling - Screening Models," EPA, *available at:* https://www.epa.gov/scram/air-quality-dispersion-modeling-screening-models.

as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs").[2, 3] 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 should be conducted prior to approval of the Project.

In an effort to quantitatively estimate the Project's construction-related and operational air quality emissions, we used the California Emissions Estimator Model ("CalEEMod") Version 2022.1.1.29,[4] as well as Project-specific information provided by the Memo. In our model, we included 129 dwelling units of "Apartments Mid Rise" on a 6.41-acre lot (Memo, p. 2). All other values were left as default.

We then prepared a preliminary health risk analysis ("HRA") of the Project's construction and operational health risk impact to residential sensitive receptors using the annual particulate matter 2.5 ("$PM_{2.5}$") exhaust estimates from SWAPE's CalEEMod output files.[5] Consistent with recommendations set forth by the OEHHA, we assumed residential exposure begins during the third trimester stage of life.[6] SWAPE's CalEEMod model indicates that construction activities will generate approximately 125 pounds of diesel particulate matter ("DPM") over the 453-day construction period.[7] 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:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{124.8\ lbs}{453\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00145\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.00145 grams per second ("g/s"). Subtracting the 453-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 28.76 years. SWAPE's operational CalEEMod emissions indicate that operational activities will generate approximately 20 net pounds of DPM per year throughout operation. Applying the same equation used to estimate the construction DPM rate, we estimated the following emission rate for Project operation:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{20\ lbs}{365\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.000288\ g/s}$$

[2] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.
[3] "Health Risk Assessments for Proposed Land Use Projects." CAPCOA, July 2009, *available at:* http://www.valleyair.org/transportation/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.
[4] "CalEEMod" CAPCOA, *available at:* https://caleemod.com/.
[5] See Attachment A for SWAPE's CalEEMod output files.
[6] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-18.
[7] See Attachment B for health risk calculations.

Using this equation, we estimated an operational emission rate of 0.000288 g/s. Construction and operation were simulated as a 6.41-acre rectangular area source in AERSCREEN, with approximate dimensions of 228- by 114-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 Antioch was obtained from U.S. 2024 Census data.[8]

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project Site. The Environmental Protection Agency ("EPA") suggests that the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10% in screening procedures.[9] Review of Google Earth indicates that the nearest sensitive receptors are single family residences approximately 41 meters from the Project site (see screenshot below).


However, review of the AERSCREEN output files demonstrates that the *maximally* exposed individual receptor ("MEIR") is located approximately 125 meters from the Project site. Thus, the single-hour concentration estimated by AERSCREEN for Project construction is approximately 1.953 µg/m$^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.1953 µg/m$^3$ for Project construction at the MEIR. For Project operation, the single-hour concentration estimated by AERSCREEN is 0.3883 µg/m$^3$ DPM at

[8] "Antioch." U.S. Census Bureau, 2024, *available at:* https://datacommons.org/place/geoId/0602252?q=Antioch%2C+CA%2C+USA.
[9] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." EPA, October 1992, *available at:* https://www.epa.gov/sites/default/files/2020-09/documents/epa-454r-92-019_ocr.pdf.

approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.03883 µg/$m^3$ for Project operation at the MEIR. [10]

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA, as recommended by the Bay Area Air Quality Management District ("BAAQMD").[11] 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. 95$^{th}$ 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"), ASFs, fraction of time at home ("FAH"), and exposure frequency ("EF") utilized for the various age groups in our screening-level HRA are as follows:

[10] See Attachment C for AERSCREEN output files.

[11] "California Environmental Quality Act Air Quality Guidelines." BAAQMD, May 2017, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, p. 56; see also "Recommended Methods for Screening and Modeling Local Risks and Hazards." BAAQMD, May 2011, *available at:* https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf, p. 65, 86.

| Exposure Assumptions for Residential Individual Cancer Risk | | | | | | |
|---|---|---|---|---|---|---|
| **Age Group** | **Breathing Rate** (L/kg-day)[12] | **Age Sensitivity Factor**[13] | **Exposure Duration** (years) | **Fraction of Time at Home**[14] | **Exposure Frequency** (days/year)[15] | **Exposure Time** (hours/day) |
| 3rd Trimester | 361 | 10 | 0.25 | 0.85 | 350 | 24 |
| Infant (0 – 2) | 1090 | 10 | 2 | 0.85 | 350 | 24 |
| Child (2 – 16) | 572 | 3 | 14 | 0.72 | 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)

[12] "Air Toxics NSR Program Health Risk Assessment Guidelines." BAAQMD, December 2016, available at: https://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en#:~:text=To%20assess%20potential%20inhalation%20exposure%20to%20offsite%20workers%2C%20OEHHA%20recommended,for%20an%20eight%2Dhour%20day, p. 6; see also "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

[13] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-5 Table 8.3.

[14] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 5-24; see also: "Air Toxics NSR Program Health Risk Assessment Guidelines." BAAQMD, December 2016, available at: https://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en#:~:text=To%20assess%20potential%20inhalation%20exposure%20to%20offsite%20workers%2C%20OEHHA%20recommended,for%20an%20eight%2Dhour%20day, p. 4, 5.

[15] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 5-24.

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:

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

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 453-day construction schedule, the annualized average concentration for construction was used for the entire third trimester of pregnancy (0.25 years), as well as the first 0.99 years of the infantile stage of life (0 – 2 years). The annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the latter 1.01 years of the infantile stage of life, the entire child (2 – 16 years) stage of life, as well as the entire adult (16 – 30 years) stage of life. 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 | 0.1953 | 2.26E-06 |
| | *Construction* | *0.99* | *0.1953* | *2.70E-05* |
| | *Operation* | *1.01* | *0.0388* | *5.47E-06* |
| Infant (0 - 2) | Total | 2 | | 3.25E-05 |
| Child (2 - 16) | Operation | 14 | 0.0388 | 1.01E-05 |
| Adult (16 - 30) | Operation | 14 | 0.0388 | 1.56E-06 |
| **Lifetime** | | **30** | | **4.64E-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 2.26, 32.5, 10.1, and 15.6 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years) is approximately 46.4 in one million. The infant, child, adult, and lifetime cancer risks exceed the BAAQMD threshold of 10 in one million, resulting in a potentially significant impact not previously addressed or identified by the Memo.

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 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' (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. As our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, a full CEQA analysis 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. If the refined analysis similarly concludes that the Project would result in a significant health risk impact, then mitigation measures should be incorporated, as described below in the "Feasible Mitigation Measures Available to Reduce Emissions" section.

# Mitigation

## Feasible Mitigation Measures Available to Reduce Emissions

As discussed above in the section titled "Screening-Level Analysis Demonstrates Potentially Significant Health Risk Impact," the Memo demonstrates that the Project would result in potentially significant cancer risk to nearby sensitive receptors due to Project-related DPM emissions. According to the EPA, sources of DPM include "autos, trucks, and heavy on-road and offroad equipment," which represent a "significant threat to air quality and human health." [16]

To comply with CEQA, the City must propose mitigation measures that will reduce DPM emissions to less than significant levels or to the greatest extent feasible if a refined HRA shows a significant impact. To

[16] "Diesel Particulate Matter (PM) Air Toxics." EPA, January 2021, *available at*: https://enviroatlas.epa.gov/enviroatlas/DataFactSheets/pdf/Supplemental/DieselPMairtoxics.pdf.

reduce DPM emissions during Project construction and operations from engine exhaust, the CalEEMod User's Guide recommends the following mitigation measures:

> "The emissions mitigation measures for onsite off-road construction diesel equipment include use of alternative fuel, electric equipment, diesel particulate filters (DPF), oxidation catalysts, newer tier engines, and dust suppression." [17]

Furthermore, we recommend several applicable mitigation measures pulled from Southern California Association of Governments ("SCAG")'s 2020 *RTP/SCS* Program Environmental Report's Air Quality Project Level Mitigation Measures ("PMM-AQ-1") that target Project-related DPM sources: [18]

- Minimize unnecessary vehicular and machinery activities.
- Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project. Prepare a plan for approval by the applicable air district demonstrating achievement of the applicable percent reduction for a CARB-approved fleet. Daily logging of the operating hours of the equipment should also be required.
- Ensure that all construction equipment is properly tuned and maintained.
- Minimize idling time to 5 minutes or beyond regulatory requirements —saves fuel and reduces emissions.
- Require projects within 500 feet of residences, hospitals, or schools to use Tier 4 equipment for all engines above 50 horsepower (hp) unless the individual project can demonstrate that Tier 4 engines would not be required to mitigate emissions below significance thresholds.

As demonstrated above, we have provided several mitigation measures that would reduce construction-related and operational DPM emissions. These measures offer a cost-effective, feasible way to incorporate lower-emitting design features into the proposed Project, which subsequently reduce emissions released during Project construction and operation.

A full CEQA analysis should be prepared that includes an updated, refined HRA as well as any necessary mitigation measures to reduce emissions to the maximum extent feasible. The full CEQA analysis should also demonstrate a commitment to the implementation of these measures prior to Project approval, to ensure that the Project's potentially significant emissions are reduced to the maximum extent possible.

---

[17] "Calculation Details for CalEEMod." CAPCOA, May 2021, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-a2020-4-0.pdf?sfvrsn=6, Appendix A, p. 60.

[18] "4.0 Mitigation Measures." Connect SoCal Program Environmental Impact Report Addendum #1, September 2020, available at: https://scag.ca.gov/sites/main/files/file-attachments/fpeir_connectsocal_addendum_4_mitigationmeasures.pdf?1606004420, p. 4.0-2 – 4.0-10; 4.0-19 – 4.0-23; See also: "Certified Final Connect SoCal Program Environmental Impact Report." SCAG, May 2020, *available at:* https://scag.ca.gov/peir.

## 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.

Paul E. Rosenfeld, Ph.D.

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

Attachment A

# Slatten Ranch Townhomes Custom Report

## Table of Contents

# 1. Basic Project Information

## 1.1. Basic Project Information

| Data Field | Value |
|---|---|
| Project Name | Slatten Ranch Townhomes |
| Construction Start Date | 1/1/2026 |
| Operational Year | 2027 |
| Lead Agency | — |
| Land Use Scale | Project/site |
| Analysis Level for Defaults | County |
| Windspeed (m/s) | 3.60 |
| Precipitation (days) | 20.6 |
| Location | Slatten Ranch Rd, Antioch, CA 94513, USA |
| County | Contra Costa |
| City | Antioch |
| Air District | Bay Area AQMD |
| Air Basin | San Francisco Bay Area |
| TAZ | 1395 |
| EDFZ | 1 |
| Electric Utility | Pacific Gas & Electric Company |
| Gas Utility | Pacific Gas & Electric |
| App Version | 2022.1.1.29 |

## 1.2. Land Use Types

| Land Use Subtype | Size | Unit | Lot Acreage | Building Area (sq ft) | Landscape Area (sq ft) | Special Landscape Area (sq ft) | Population | Description |
|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | 129 | Dwelling Unit | 6.41 | 123,840 | 20,000 | — | 373 | — |

### 1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

# 2. Emissions Summary

### 2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit. | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 1.64 | 1.40 | 10.5 | 16.8 | 0.03 | 0.38 | 0.86 | 1.25 | 0.35 | 0.21 | 0.56 | — | 3,566 | 3,566 | 0.13 | 0.10 | 3.84 | 3,604 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 87.4 | 87.4 | 29.2 | 29.4 | 0.05 | 1.24 | 19.8 | 21.0 | 1.14 | 10.1 | 11.3 | — | 5,436 | 5,436 | 0.22 | 0.11 | 0.10 | 5,456 |
| Average Daily (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 4.93 | 4.91 | 8.80 | 12.1 | 0.02 | 0.33 | 1.43 | 1.77 | 0.31 | 0.59 | 0.89 | — | 2,515 | 2,515 | 0.10 | 0.06 | 0.97 | 2,538 |
| Annual (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 0.90 | 0.90 | 1.61 | 2.21 | < 0.005 | 0.06 | 0.26 | 0.32 | 0.06 | 0.11 | 0.16 | — | 416 | 416 | 0.02 | 0.01 | 0.16 | 420 |

### 2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Year | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily - Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2026 | 1.64 | 1.40 | 10.5 | 16.8 | 0.03 | 0.38 | 0.86 | 1.25 | 0.35 | 0.21 | 0.56 | — | 3,566 | 3,566 | 0.13 | 0.10 | 3.84 | 3,604 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily - Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2026 | 3.80 | 3.20 | 29.2 | 29.4 | 0.05 | 1.24 | 19.8 | 21.0 | 1.14 | 10.1 | 11.3 | — | 5,436 | 5,436 | 0.22 | 0.11 | 0.10 | 5,456 |
| 2027 | 87.4 | 87.4 | 10.1 | 16.0 | 0.03 | 0.34 | 0.86 | 1.21 | 0.31 | 0.21 | 0.52 | — | 3,476 | 3,476 | 0.14 | 0.11 | 0.09 | 3,511 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2026 | 1.29 | 1.08 | 8.80 | 12.1 | 0.02 | 0.33 | 1.43 | 1.77 | 0.31 | 0.59 | 0.89 | — | 2,515 | 2,515 | 0.10 | 0.06 | 0.97 | 2,538 |
| 2027 | 4.93 | 4.91 | 1.04 | 1.63 | < 0.005 | 0.04 | 0.07 | 0.10 | 0.04 | 0.02 | 0.05 | — | 316 | 316 | 0.01 | 0.01 | 0.11 | 319 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2026 | 0.24 | 0.20 | 1.61 | 2.21 | < 0.005 | 0.06 | 0.26 | 0.32 | 0.06 | 0.11 | 0.16 | — | 416 | 416 | 0.02 | 0.01 | 0.16 | 420 |
| 2027 | 0.90 | 0.90 | 0.19 | 0.30 | < 0.005 | 0.01 | 0.01 | 0.02 | 0.01 | < 0.005 | 0.01 | — | 52.3 | 52.3 | < 0.005 | < 0.005 | 0.02 | 52.7 |

## 2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit. | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 6.78 | 6.44 | 3.58 | 29.7 | 0.06 | 0.16 | 4.92 | 5.08 | 0.16 | 1.25 | 1.41 | 60.4 | 7,693 | 7,753 | 6.37 | 0.24 | 18.5 | 8,001 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 5.96 | 5.65 | 3.86 | 20.6 | 0.06 | 0.16 | 4.92 | 5.08 | 0.16 | 1.25 | 1.41 | 60.4 | 7,302 | 7,363 | 6.40 | 0.26 | 1.34 | 7,601 |
| Average Daily (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 5.99 | 5.75 | 2.40 | 22.0 | 0.05 | 0.06 | 4.61 | 4.67 | 0.06 | 1.17 | 1.23 | 60.4 | 5,527 | 5,587 | 6.35 | 0.23 | 8.11 | 5,824 |
| Annual (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 1.09 | 1.05 | 0.44 | 4.02 | 0.01 | 0.01 | 0.84 | 0.85 | 0.01 | 0.21 | 0.22 | 10.00 | 915 | 925 | 1.05 | 0.04 | 1.34 | 964 |

## 2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Sector | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.79 | 2.58 | 1.95 | 21.7 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,429 | 5,429 | 0.21 | 0.21 | 17.6 | 5,513 |
| Area | 3.96 | 3.84 | 1.34 | 7.87 | 0.01 | 0.11 | — | 0.11 | 0.11 | — | 0.11 | 0.00 | 1,636 | 1,636 | 0.03 | < 0.005 | — | 1,637 |
| Energy | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 610 | 610 | 0.07 | 0.01 | — | 613 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Total | 6.78 | 6.44 | 3.58 | 29.7 | 0.06 | 0.16 | 4.92 | 5.08 | 0.16 | 1.25 | 1.41 | 60.4 | 7,693 | 7,753 | 6.37 | 0.24 | 18.5 | 8,001 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.65 | 2.43 | 2.30 | 19.9 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,059 | 5,059 | 0.23 | 0.23 | 0.46 | 5,132 |
| Area | 3.28 | 3.20 | 1.27 | 0.54 | 0.01 | 0.10 | — | 0.10 | 0.10 | — | 0.10 | 0.00 | 1,616 | 1,616 | 0.03 | < 0.005 | — | 1,618 |
| Energy | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 610 | 610 | 0.07 | 0.01 | — | 613 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Total | 5.96 | 5.65 | 3.86 | 20.6 | 0.06 | 0.16 | 4.92 | 5.08 | 0.16 | 1.25 | 1.41 | 60.4 | 7,302 | 7,363 | 6.40 | 0.26 | 1.34 | 7,601 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.49 | 2.29 | 2.05 | 18.3 | 0.05 | 0.03 | 4.61 | 4.65 | 0.03 | 1.17 | 1.20 | — | 4,850 | 4,850 | 0.21 | 0.21 | 7.23 | 4,924 |
| Area | 3.47 | 3.45 | 0.07 | 3.63 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 49.5 | 49.5 | < 0.005 | < 0.005 | — | 49.6 |
| Energy | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 610 | 610 | 0.07 | 0.01 | — | 613 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Total | 5.99 | 5.75 | 2.40 | 22.0 | 0.05 | 0.06 | 4.61 | 4.67 | 0.06 | 1.17 | 1.23 | 60.4 | 5,527 | 5,587 | 6.35 | 0.23 | 8.11 | 5,824 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 0.46 | 0.42 | 0.37 | 3.34 | 0.01 | 0.01 | 0.84 | 0.85 | 0.01 | 0.21 | 0.22 | — | 803 | 803 | 0.03 | 0.03 | 1.20 | 815 |
| Area | 0.63 | 0.63 | 0.01 | 0.66 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 8.20 | 8.20 | < 0.005 | < 0.005 | — | 8.21 |
| Energy | 0.01 | < 0.005 | 0.05 | 0.02 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 101 | 101 | 0.01 | < 0.005 | — | 102 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 1.49 | 2.95 | 4.44 | 0.15 | < 0.005 | — | 9.36 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 8.51 | 0.00 | 8.51 | 0.85 | 0.00 | — | 29.8 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.15 | 0.15 |
| Total | 1.09 | 1.05 | 0.44 | 4.02 | 0.01 | 0.01 | 0.84 | 0.85 | 0.01 | 0.21 | 0.22 | 10.00 | 915 | 925 | 1.05 | 0.04 | 1.34 | 964 |

# 3. Construction Emissions Details

## 3.1. Demolition (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 2.72 | 2.29 | 20.7 | 19.0 | 0.03 | 0.84 | — | 0.84 | 0.78 | — | 0.78 | — | 3,427 | 3,427 | 0.14 | 0.03 | — | 3,438 |
| Demolition | — | — | — | — | — | — | 0.00 | 0.00 | — | 0.00 | 0.00 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.15 | 0.13 | 1.13 | 1.04 | < 0.005 | 0.05 | — | 0.05 | 0.04 | — | 0.04 | — | 188 | 188 | 0.01 | < 0.005 | — | 188 |
| Demolition | — | — | — | — | — | — | 0.00 | 0.00 | — | 0.00 | 0.00 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.03 | 0.02 | 0.21 | 0.19 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 31.1 | 31.1 | < 0.005 | < 0.005 | — | 31.2 |
| Demolition | — | — | — | — | — | — | 0.00 | 0.00 | — | 0.00 | 0.00 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.05 | 0.04 | 0.04 | 0.50 | 0.00 | 0.00 | 0.12 | 0.12 | 0.00 | 0.03 | 0.03 | — | 119 | 119 | < 0.005 | 0.01 | 0.01 | 120 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.03 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 6.57 | 6.57 | < 0.005 | < 0.005 | 0.01 | 6.67 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 1.09 | 1.09 | < 0.005 | < 0.005 | < 0.005 | 1.10 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.3. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 3.74 | 3.14 | 29.2 | 28.8 | 0.05 | 1.24 | — | 1.24 | 1.14 | — | 1.14 | — | 5,298 | 5,298 | 0.21 | 0.04 | — | 5,316 |
| Dust From Material Movement | — | — | — | — | — | — | 19.7 | 19.7 | — | 10.1 | 10.1 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.10 | 0.09 | 0.80 | 0.79 | < 0.005 | 0.03 | — | 0.03 | 0.03 | — | 0.03 | — | 145 | 145 | 0.01 | < 0.005 | — | 146 |
| Dust From Material Movement | — | — | — | — | — | — | 0.54 | 0.54 | — | 0.28 | 0.28 | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.02 | 0.02 | 0.15 | 0.14 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 24.0 | 24.0 | < 0.005 | < 0.005 | — | 24.1 |
| Dust From Material Movement | — | — | — | — | — | — | 0.10 | 0.10 | — | 0.05 | 0.05 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.06 | 0.05 | 0.05 | 0.58 | 0.00 | 0.00 | 0.14 | 0.14 | 0.00 | 0.03 | 0.03 | — | 138 | 138 | < 0.005 | 0.01 | 0.01 | 140 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.02 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 3.83 | 3.83 | < 0.005 | < 0.005 | 0.01 | 3.89 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 0.63 | 0.63 | < 0.005 | < 0.005 | < 0.005 | 0.64 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.5. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.96 | 1.65 | 15.0 | 17.4 | 0.03 | 0.65 | — | 0.65 | 0.59 | — | 0.59 | — | 2,960 | 2,960 | 0.12 | 0.02 | — | 2,970 |
| Dust From Material Movement | — | — | — | — | — | — | 7.08 | 7.08 | — | 3.42 | 3.42 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.11 | 0.09 | 0.82 | 0.96 | < 0.005 | 0.04 | — | 0.04 | 0.03 | — | 0.03 | — | 162 | 162 | 0.01 | < 0.005 | — | 163 |
| Dust From Material Movement | — | — | — | — | — | — | 0.39 | 0.39 | — | 0.19 | 0.19 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road Equipment | 0.02 | 0.02 | 0.15 | 0.17 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 26.8 | 26.8 | < 0.005 | < 0.005 | — | 26.9 |
| Dust From Material Movement | — | — | — | — | — | — | 0.07 | 0.07 | — | 0.03 | 0.03 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.05 | 0.04 | 0.04 | 0.50 | 0.00 | 0.00 | 0.12 | 0.12 | 0.00 | 0.03 | 0.03 | — | 119 | 119 | < 0.005 | 0.01 | 0.01 | 120 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.03 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 6.57 | 6.57 | < 0.005 | < 0.005 | 0.01 | 6.67 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 1.09 | 1.09 | < 0.005 | < 0.005 | < 0.005 | 1.10 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.7. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.28 | 1.07 | 9.85 | 13.0 | 0.02 | 0.38 | — | 0.38 | 0.35 | — | 0.35 | — | 2,397 | 2,397 | 0.10 | 0.02 | — | 2,405 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.28 | 1.07 | 9.85 | 13.0 | 0.02 | 0.38 | — | 0.38 | 0.35 | — | 0.35 | — | 2,397 | 2,397 | 0.10 | 0.02 | — | 2,405 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.73 | 0.61 | 5.63 | 7.41 | 0.01 | 0.22 | — | 0.22 | 0.20 | — | 0.20 | — | 1,370 | 1,370 | 0.06 | 0.01 | — | 1,375 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.13 | 0.11 | 1.03 | 1.35 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 227 | 227 | 0.01 | < 0.005 | — | 228 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.33 | 0.32 | 0.20 | 3.64 | 0.00 | 0.00 | 0.77 | 0.77 | 0.00 | 0.18 | 0.18 | — | 803 | 803 | 0.01 | 0.03 | 2.96 | 815 |
| Vendor | 0.03 | 0.01 | 0.47 | 0.23 | < 0.005 | 0.01 | 0.10 | 0.10 | 0.01 | 0.03 | 0.03 | — | 366 | 366 | 0.02 | 0.05 | 0.88 | 383 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.31 | 0.28 | 0.26 | 3.07 | 0.00 | 0.00 | 0.77 | 0.77 | 0.00 | 0.18 | 0.18 | — | 735 | 735 | 0.02 | 0.03 | 0.08 | 745 |
| Vendor | 0.03 | 0.01 | 0.49 | 0.23 | < 0.005 | 0.01 | 0.10 | 0.10 | 0.01 | 0.03 | 0.03 | — | 366 | 366 | 0.02 | 0.05 | 0.02 | 382 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.17 | 0.16 | 0.13 | 1.71 | 0.00 | 0.00 | 0.43 | 0.43 | 0.00 | 0.10 | 0.10 | — | 424 | 424 | 0.01 | 0.02 | 0.73 | 431 |
| Vendor | 0.02 | 0.01 | 0.28 | 0.13 | < 0.005 | < 0.005 | 0.05 | 0.06 | < 0.005 | 0.02 | 0.02 | — | 209 | 209 | 0.01 | 0.03 | 0.22 | 219 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.03 | 0.03 | 0.02 | 0.31 | 0.00 | 0.00 | 0.08 | 0.08 | 0.00 | 0.02 | 0.02 | — | 70.2 | 70.2 | < 0.005 | < 0.005 | 0.12 | 71.3 |
| Vendor | < 0.005 | < 0.005 | 0.05 | 0.02 | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | 34.6 | 34.6 | < 0.005 | 0.01 | 0.04 | 36.2 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.9. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.23 | 1.03 | 9.39 | 12.9 | 0.02 | 0.34 | — | 0.34 | 0.31 | — | 0.31 | — | 2,397 | 2,397 | 0.10 | 0.02 | — | 2,405 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.07 | 0.06 | 0.57 | 0.78 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 145 | 145 | 0.01 | < 0.005 | — | 146 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.01 | 0.01 | 0.10 | 0.14 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 24.1 | 24.1 | < 0.005 | < 0.005 | — | 24.2 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.30 | 0.27 | 0.24 | 2.89 | 0.00 | 0.00 | 0.77 | 0.77 | 0.00 | 0.18 | 0.18 | — | 721 | 721 | 0.02 | 0.03 | 0.07 | 731 |
| Vendor | 0.03 | 0.01 | 0.47 | 0.22 | < 0.005 | 0.01 | 0.10 | 0.10 | 0.01 | 0.03 | 0.03 | — | 358 | 358 | 0.02 | 0.05 | 0.02 | 375 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 0.02 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.01 | 0.01 | — | 44.2 | 44.2 | < 0.005 | < 0.005 | 0.07 | 44.8 |
| Vendor | < 0.005 | < 0.005 | 0.03 | 0.01 | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | 21.7 | 21.7 | < 0.005 | < 0.005 | 0.02 | 22.8 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.03 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 7.32 | 7.32 | < 0.005 | < 0.005 | 0.01 | 7.42 |
| Vendor | < 0.005 | < 0.005 | 0.01 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | — | 3.60 | 3.60 | < 0.005 | < 0.005 | < 0.005 | 3.77 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.11. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.88 | 0.74 | 6.94 | 9.95 | 0.01 | 0.30 | — | 0.30 | 0.27 | — | 0.27 | — | 1,511 | 1,511 | 0.06 | 0.01 | — | 1,516 |
| Paving | 0.00 | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.05 | 0.04 | 0.38 | 0.55 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 82.8 | 82.8 | < 0.005 | < 0.005 | — | 83.1 |
| Paving | 0.00 | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.01 | 0.01 | 0.07 | 0.10 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 13.7 | 13.7 | < 0.005 | < 0.005 | — | 13.8 |
| Paving | 0.00 | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.05 | 0.04 | 0.04 | 0.47 | 0.00 | 0.00 | 0.12 | 0.12 | 0.00 | 0.03 | 0.03 | — | 116 | 116 | < 0.005 | 0.01 | 0.01 | 118 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 6.45 | 6.45 | < 0.005 | < 0.005 | 0.01 | 6.54 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 1.07 | 1.07 | < 0.005 | < 0.005 | < 0.005 | 1.08 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.13. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.14 | 0.11 | 0.83 | 1.13 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 134 | 134 | 0.01 | < 0.005 | — | 134 |
| Architectural Coatings | 87.2 | 87.2 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.01 | 0.01 | 0.05 | 0.06 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 7.32 | 7.32 | < 0.005 | < 0.005 | — | 7.34 |
| Architectural Coatings | 4.78 | 4.78 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 1.21 | 1.21 | < 0.005 | < 0.005 | — | 1.22 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Architectural Coating | 0.87 | 0.87 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.06 | 0.05 | 0.05 | 0.58 | 0.00 | 0.00 | 0.15 | 0.15 | 0.00 | 0.04 | 0.04 | — | 144 | 144 | < 0.005 | 0.01 | 0.01 | 146 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.03 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 7.98 | 7.98 | < 0.005 | < 0.005 | 0.01 | 8.10 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.01 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 1.32 | 1.32 | < 0.005 | < 0.005 | < 0.005 | 1.34 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# 4. Operations Emissions Details

## 4.1. Mobile Emissions by Land Use

### 4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | 2.79 | 2.58 | 1.95 | 21.7 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,429 | 5,429 | 0.21 | 0.21 | 17.6 | 5,513 |
| Total | 2.79 | 2.58 | 1.95 | 21.7 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,429 | 5,429 | 0.21 | 0.21 | 17.6 | 5,513 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | 2.65 | 2.43 | 2.30 | 19.9 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,059 | 5,059 | 0.23 | 0.23 | 0.46 | 5,132 |
| Total | 2.65 | 2.43 | 2.30 | 19.9 | 0.05 | 0.04 | 4.92 | 4.95 | 0.03 | 1.25 | 1.28 | — | 5,059 | 5,059 | 0.23 | 0.23 | 0.46 | 5,132 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | 0.46 | 0.42 | 0.37 | 3.34 | 0.01 | 0.01 | 0.84 | 0.85 | 0.01 | 0.21 | 0.22 | — | 803 | 803 | 0.03 | 0.03 | 1.20 | 815 |
| Total | 0.46 | 0.42 | 0.37 | 3.34 | 0.01 | 0.01 | 0.84 | 0.85 | 0.01 | 0.21 | 0.22 | — | 803 | 803 | 0.03 | 0.03 | 1.20 | 815 |

## 4.2. Energy

### 4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | 246 | 246 | 0.04 | < 0.005 | — | 248 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 246 | 246 | 0.04 | < 0.005 | — | 248 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | 246 | 246 | 0.04 | < 0.005 | — | 248 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 246 | 246 | 0.04 | < 0.005 | — | 248 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | 40.7 | 40.7 | 0.01 | < 0.005 | — | 41.1 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 40.7 | 40.7 | 0.01 | < 0.005 | — | 41.1 |

### 4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 364 | 364 | 0.03 | < 0.005 | — | 365 |
| Total | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 364 | 364 | 0.03 | < 0.005 | — | 365 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 364 | 364 | 0.03 | < 0.005 | — | 365 |
| Total | 0.03 | 0.02 | 0.29 | 0.12 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 364 | 364 | 0.03 | < 0.005 | — | 365 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments | 0.01 | < 0.005 | 0.05 | 0.02 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 60.3 | 60.3 | 0.01 | < 0.005 | — | 60.4 |
| Total | 0.01 | < 0.005 | 0.05 | 0.02 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 60.3 | 60.3 | 0.01 | < 0.005 | — | 60.4 |

## 4.3. Area Emissions by Source

### 4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Source | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | 0.15 | 0.07 | 1.27 | 0.54 | 0.01 | 0.10 | — | 0.10 | 0.10 | — | 0.10 | 0.00 | 1,616 | 1,616 | 0.03 | < 0.005 | — | 1,618 |
| Consumer Products | 2.65 | 2.65 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Architectural Coatings | 0.48 | 0.48 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Landscape Equipment | 0.68 | 0.64 | 0.07 | 7.32 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 19.6 | 19.6 | < 0.005 | < 0.005 | — | 19.6 |
| Total | 3.96 | 3.84 | 1.34 | 7.87 | 0.01 | 0.11 | — | 0.11 | 0.11 | — | 0.11 | 0.00 | 1,636 | 1,636 | 0.03 | < 0.005 | — | 1,637 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | 0.15 | 0.07 | 1.27 | 0.54 | 0.01 | 0.10 | — | 0.10 | 0.10 | — | 0.10 | 0.00 | 1,616 | 1,616 | 0.03 | < 0.005 | — | 1,618 |
| Consumer Products | 2.65 | 2.65 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Architectural | 0.48 | 0.48 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | 3.28 | 3.20 | 1.27 | 0.54 | 0.01 | 0.10 | — | 0.10 | 0.10 | — | 0.10 | 0.00 | 1,616 | 1,616 | 0.03 | < 0.005 | — | 1,618 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | < 0.005 | < 0.005 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 6.60 | 6.60 | < 0.005 | < 0.005 | — | 6.60 |
| Consumer Products | 0.48 | 0.48 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Architectural Coatings | 0.09 | 0.09 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Landscape Equipment | 0.06 | 0.06 | 0.01 | 0.66 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 1.60 | 1.60 | < 0.005 | < 0.005 | — | 1.60 |
| Total | 0.63 | 0.63 | 0.01 | 0.66 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 8.20 | 8.20 | < 0.005 | < 0.005 | — | 8.21 |

## 4.4. Water Emissions by Land Use

### 4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 9.00 | 17.8 | 26.8 | 0.93 | 0.02 | — | 56.6 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 1.49 | 2.95 | 4.44 | 0.15 | < 0.005 | — | 9.36 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 1.49 | 2.95 | 4.44 | 0.15 | < 0.005 | — | 9.36 |

## 4.5. Waste Emissions by Land Use

### 4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 51.4 | 0.00 | 51.4 | 5.14 | 0.00 | — | 180 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | 8.51 | 0.00 | 8.51 | 0.85 | 0.00 | — | 29.8 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 8.51 | 0.00 | 8.51 | 0.85 | 0.00 | — | 29.8 |

## 4.6. Refrigerant Emissions by Land Use

### 4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.89 | 0.89 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Apartments Mid Rise | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.15 | 0.15 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.15 | 0.15 |

## 4.7. Offroad Emissions By Equipment Type

### 4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.8. Stationary Emissions By Equipment Type

### 4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.9. User Defined Emissions By Equipment Type

### 4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.10. Soil Carbon Accumulation By Vegetation Type

### 4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Vegetation | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Species | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

# 5. Activity Data

## 5.1. Construction Schedule

| Phase Name | Phase Type | Start Date | End Date | Days Per Week | Work Days per Phase | Phase Description |
|---|---|---|---|---|---|---|
| Demolition | Demolition | 1/1/2026 | 1/29/2026 | 5.00 | 20.0 | — |
| Site Preparation | Site Preparation | 1/30/2026 | 2/13/2026 | 5.00 | 10.0 | — |
| Grading | Grading | 2/14/2026 | 3/14/2026 | 5.00 | 20.0 | — |

| | | | | | | |
|---|---|---|---|---|---|---|
| Building Construction | Building Construction | 3/15/2026 | 1/31/2027 | 5.00 | 230 | — |
| Paving | Paving | 2/1/2027 | 3/1/2027 | 5.00 | 20.0 | — |
| Architectural Coating | Architectural Coating | 3/2/2027 | 3/30/2027 | 5.00 | 20.0 | — |

## 5.2. Off-Road Equipment

### 5.2.1. Unmitigated

| Phase Name | Equipment Type | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|---|---|---|---|---|---|---|---|
| Demolition | Rubber Tired Dozers | Diesel | Average | 2.00 | 8.00 | 367 | 0.40 |
| Demolition | Excavators | Diesel | Average | 3.00 | 8.00 | 36.0 | 0.38 |
| Demolition | Concrete/Industrial Saws | Diesel | Average | 1.00 | 8.00 | 33.0 | 0.73 |
| Site Preparation | Rubber Tired Dozers | Diesel | Average | 3.00 | 8.00 | 367 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | Diesel | Average | 4.00 | 8.00 | 84.0 | 0.37 |
| Grading | Graders | Diesel | Average | 1.00 | 8.00 | 148 | 0.41 |
| Grading | Excavators | Diesel | Average | 1.00 | 8.00 | 36.0 | 0.38 |
| Grading | Tractors/Loaders/Backhoes | Diesel | Average | 3.00 | 8.00 | 84.0 | 0.37 |
| Grading | Rubber Tired Dozers | Diesel | Average | 1.00 | 8.00 | 367 | 0.40 |
| Building Construction | Forklifts | Diesel | Average | 3.00 | 8.00 | 82.0 | 0.20 |
| Building Construction | Generator Sets | Diesel | Average | 1.00 | 8.00 | 14.0 | 0.74 |
| Building Construction | Cranes | Diesel | Average | 1.00 | 7.00 | 367 | 0.29 |
| Building Construction | Welders | Diesel | Average | 1.00 | 8.00 | 46.0 | 0.45 |
| Building Construction | Tractors/Loaders/Backhoes | Diesel | Average | 3.00 | 7.00 | 84.0 | 0.37 |
| Paving | Pavers | Diesel | Average | 2.00 | 8.00 | 81.0 | 0.42 |
| Paving | Paving Equipment | Diesel | Average | 2.00 | 8.00 | 89.0 | 0.36 |
| Paving | Rollers | Diesel | Average | 2.00 | 8.00 | 36.0 | 0.38 |
| Architectural Coating | Air Compressors | Diesel | Average | 1.00 | 6.00 | 37.0 | 0.48 |

## 5.3. Construction Vehicles

### 5.3.1. Unmitigated

| Phase Name | Trip Type | One-Way Trips per Day | Miles per Trip | Vehicle Mix |
|---|---|---|---|---|
| Demolition | — | — | — | — |
| Demolition | Worker | 15.0 | 11.7 | LDA,LDT1,LDT2 |
| Demolition | Vendor | — | 8.40 | HHDT,MHDT |
| Demolition | Hauling | 0.00 | 20.0 | HHDT |
| Demolition | Onsite truck | — | — | HHDT |
| Site Preparation | — | — | — | — |
| Site Preparation | Worker | 17.5 | 11.7 | LDA,LDT1,LDT2 |
| Site Preparation | Vendor | — | 8.40 | HHDT,MHDT |
| Site Preparation | Hauling | 0.00 | 20.0 | HHDT |
| Site Preparation | Onsite truck | — | — | HHDT |
| Grading | — | — | — | — |
| Grading | Worker | 15.0 | 11.7 | LDA,LDT1,LDT2 |
| Grading | Vendor | — | 8.40 | HHDT,MHDT |
| Grading | Hauling | 0.00 | 20.0 | HHDT |
| Grading | Onsite truck | — | — | HHDT |
| Building Construction | — | — | — | — |
| Building Construction | Worker | 92.9 | 11.7 | LDA,LDT1,LDT2 |
| Building Construction | Vendor | 13.8 | 8.40 | HHDT,MHDT |
| Building Construction | Hauling | 0.00 | 20.0 | HHDT |
| Building Construction | Onsite truck | — | — | HHDT |
| Paving | — | — | — | — |
| Paving | Worker | 15.0 | 11.7 | LDA,LDT1,LDT2 |
| Paving | Vendor | — | 8.40 | HHDT,MHDT |
| Paving | Hauling | 0.00 | 20.0 | HHDT |

| | | | | |
|---|---|---|---|---|
| Paving | Onsite truck | — | — | HHDT |
| Architectural Coating | — | — | — | — |
| Architectural Coating | Worker | 18.6 | 11.7 | LDA,LDT1,LDT2 |
| Architectural Coating | Vendor | — | 8.40 | HHDT,MHDT |
| Architectural Coating | Hauling | 0.00 | 20.0 | HHDT |
| Architectural Coating | Onsite truck | — | — | HHDT |

## 5.4. Vehicles

### 5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

## 5.5. Architectural Coatings

| Phase Name | Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|---|---|---|---|---|---|
| Architectural Coating | 250,776 | 83,592 | 0.00 | 0.00 | — |

## 5.6. Dust Mitigation

### 5.6.1. Construction Earthmoving Activities

| Phase Name | Material Imported (cy) | Material Exported (cy) | Acres Graded (acres) | Material Demolished (sq. ft.) | Acres Paved (acres) |
|---|---|---|---|---|---|
| Demolition | 0.00 | 0.00 | 0.00 | — | — |
| Site Preparation | — | — | 15.0 | 0.00 | — |
| Grading | — | — | 20.0 | 0.00 | — |
| Paving | 0.00 | 0.00 | 0.00 | 0.00 | — |

### 5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

## 5.7. Construction Paving

| Land Use | Area Paved (acres) | % Asphalt |
|---|---|---|
| Apartments Mid Rise | — | 0% |

## 5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

| Year | kWh per Year | CO2 | CH4 | N2O |
|---|---|---|---|---|
| 2026 | 0.00 | 204 | 0.03 | < 0.005 |
| 2027 | 0.00 | 204 | 0.03 | < 0.005 |

## 5.9. Operational Mobile Sources

### 5.9.1. Unmitigated

| Land Use Type | Trips/Weekday | Trips/Saturday | Trips/Sunday | Trips/Year | VMT/Weekday | VMT/Saturday | VMT/Sunday | VMT/Year |
|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | 702 | 633 | 528 | 243,497 | 6,966 | 6,287 | 5,237 | 2,417,087 |

## 5.10. Operational Area Sources

### 5.10.1. Hearths

#### 5.10.1.1. Unmitigated

| Hearth Type | Unmitigated (number) |
|---|---|
| Apartments Mid Rise | — |
| Wood Fireplaces | 0 |
| Gas Fireplaces | 66 |
| Propane Fireplaces | 0 |
| Electric Fireplaces | 0 |

| | |
|---|---|
| No Fireplaces | 63 |
| Conventional Wood Stoves | 0 |
| Catalytic Wood Stoves | 0 |
| Non-Catalytic Wood Stoves | 0 |
| Pellet Wood Stoves | 0 |

### 5.10.2. Architectural Coatings

| Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|---|---|---|---|---|
| 250776 | 83,592 | 0.00 | 0.00 | — |

### 5.10.3. Landscape Equipment

| Season | Unit | Value |
|---|---|---|
| Snow Days | day/yr | 0.00 |
| Summer Days | day/yr | 180 |

## 5.11. Operational Energy Consumption

### 5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

| Land Use | Electricity (kWh/yr) | CO2 | CH4 | N2O | Natural Gas (kBTU/yr) |
|---|---|---|---|---|---|
| Apartments Mid Rise | 440,077 | 204 | 0.0330 | 0.0040 | 1,135,725 |

## 5.12. Operational Water and Wastewater Consumption

### 5.12.1. Unmitigated

| Land Use | Indoor Water (gal/year) | Outdoor Water (gal/year) |
|---|---|---|
| Apartments Mid Rise | 4,694,610 | 291,748 |

## 5.13. Operational Waste Generation

### 5.13.1. Unmitigated

| Land Use | Waste (ton/year) | Cogeneration (kWh/year) |
|---|---|---|
| Apartments Mid Rise | 95.4 | — |

## 5.14. Operational Refrigeration and Air Conditioning Equipment

### 5.14.1. Unmitigated

| Land Use Type | Equipment Type | Refrigerant | GWP | Quantity (kg) | Operations Leak Rate | Service Leak Rate | Times Serviced |
|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | Average room A/C & Other residential A/C and heat pumps | R-410A | 2,088 | < 0.005 | 2.50 | 2.50 | 10.0 |
| Apartments Mid Rise | Household refrigerators and/or freezers | R-134a | 1,430 | 0.12 | 0.60 | 0.00 | 1.00 |

## 5.15. Operational Off-Road Equipment

### 5.15.1. Unmitigated

| Equipment Type | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|---|---|---|---|---|---|---|

## 5.16. Stationary Sources

### 5.16.1. Emergency Generators and Fire Pumps

| Equipment Type | Fuel Type | Number per Day | Hours per Day | Hours per Year | Horsepower | Load Factor |
|---|---|---|---|---|---|---|

### 5.16.2. Process Boilers

| Equipment Type | Fuel Type | Number | Boiler Rating (MMBtu/hr) | Daily Heat Input (MMBtu/day) | Annual Heat Input (MMBtu/yr) |
|---|---|---|---|---|---|

## 5.17. User Defined

| Equipment Type | Fuel Type |
|---|---|

## 5.18. Vegetation

### 5.18.1. Land Use Change

#### 5.18.1.1. Unmitigated

| Vegetation Land Use Type | Vegetation Soil Type | Initial Acres | Final Acres |
|---|---|---|---|

### 5.18.1. Biomass Cover Type

#### 5.18.1.1. Unmitigated

| Biomass Cover Type | Initial Acres | Final Acres |
|---|---|---|

### 5.18.2. Sequestration

#### 5.18.2.1. Unmitigated

| Tree Type | Number | Electricity Saved (kWh/year) | Natural Gas Saved (btu/year) |
|---|---|---|---|

# 8. User Changes to Default Data

| Screen | Justification |
|---|---|
| Land Use | Consistent with the Staff Report. |

| Construction | | | | | |
|---|---|---|---|---|---|
| **2026** | | | **Total** | | |
| Annual Emissions (tons/year) | 0.06 | | Total DPM (lbs) | 124.8219178 | |
| Daily Emissions (lbs/day) | 0.328767123 | | Total DPM (g) | 56619.22192 | |
| Construction Duration (days) | 365 | | Emission Rate (g/s) | 0.001446612 | |
| Total DPM (lbs) | 120 | | Release Height (meters) | 3 | |
| Total DPM (g) | 54432 | | Total Acreage | 6.41 | |
| Start Date | 1/1/2026 | | Max Horizontal (meters) | 227.77 | |
| End Date | 1/1/2027 | | Min Horizontal (meters) | 113.89 | |
| Construction Days | 365 | | Initial Vertical Dimension (meters) | 1.5 | |
| **2027** | | | Setting | Urban | |
| Annual Emissions (tons/year) | 0.01 | | Population | 118,453 | |
| Daily Emissions (lbs/day) | 0.054794521 | | Start Date | 1/1/2026 | |
| Construction Duration (days) | 88 | | End Date | 3/30/2027 | |
| Total DPM (lbs) | 4.821917808 | | Total Construction Days | 453 | |
| Total DPM (g) | 2187.221918 | | Total Years of Construction | 1.24 | |
| Start Date | 1/1/2027 | | Total Years of Operation | 28.76 | |
| End Date | 3/30/2027 | | | | |
| Construction Days | 88 | | | | |

| Operation | |
|---|---|
| **Emission Rate** | |
| Annual Emissions (tons/year) | 0.01 |
| Daily Emissions (lbs/day) | 0.054794521 |
| Total DPM (lbs) | 20 |
| Emission Rate (g/s) | 0.000287671 |
| Release Height (meters) | 3 |
| Total Acreage | 6.41 |
| Max Horizontal (meters) | 227.77 |
| Min Horizontal (meters) | 113.89 |
| Initial Vertical Dimension (meters) | 1.5 |
| Setting | Urban |
| Population | 118,453 |

| 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 | 0.1953 | 2.26E-06 |
| | *Construction* | *0.99* | *0.1953* | *2.70E-05* |
| | *Operation* | *1.01* | *0.0388* | *5.47E-06* |
| Infant (0 - 2) | Total | 2 | | 3.25E-05 |
| Child (2 - 16) | Operation | 14 | 0.0388 | 1.01E-05 |
| Adult (16 - 30) | Operation | 14 | 0.0388 | 1.56E-06 |
| **Lifetime** | | **30** | | **4.64E-05** |

AERSCREEN 21112 / AERMOD 21112 08/08/25
16:01:15

TITLE: Slatten Townhomes,Construction

---

********** AREA PARAMETERS **********

---

| | | | | |
|---|---|---|---|---|
| SOURCE EMISSION RATE: | 0.145E-02 | g/s | 0.115E-01 | lb/hr |
| AREA EMISSION RATE: | 0.558E-07 | g/(s-m2) | 0.443E-06 | lb/(hr-m2) |
| AREA HEIGHT: | 3.00 | meters | 9.84 | feet |
| AREA SOURCE LONG SIDE: | 227.77 | meters | 747.28 | feet |
| AREA SOURCE SHORT SIDE: | 113.89 | meters | 373.65 | feet |
| INITIAL VERTICAL DIMENSION: | 1.50 | meters | 4.92 | feet |
| RURAL OR URBAN: | URBAN | | | |
| POPULATION: | 118453 | | | |
| INITIAL PROBE DISTANCE = | 5000. | meters | 16404. | feet |

---

********** BUILDING DOWNWASH PARAMETERS **********

---

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

---

********** FLOW SECTOR ANALYSIS **********

25 meter receptor spacing: 1. meters - 5000. meters

---

MAXIMUM IMPACT RECEPTOR

| Zo SECTOR | SURFACE ROUGHNESS | 1-HR CONC (ug/m3) | RADIAL (deg) | DIST (m) | TEMPORAL PERIOD |
|---|---|---|---|---|---|
| 1* | 1.000 | 1.953 | 25 | 125.0 | WIN |

* = worst case diagonal

---

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Average Moisture
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 1.50
ROUGHNESS LENGTH: 1.000 (meters)

SURFACE FRICTION VELOCITY (U*) NOT ADUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 01 | 10 | 10 | 01 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| -1.30 | 0.043 | -9.000 | 0.020 | -999. | 21. | 6.0 | 1.000 | 1.50 | 0.35 | 0.50 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

********** AERSCREEN AUTOMATED DISTANCES **********
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

| DIST (m) | MAXIMUM 1-HR CONC (ug/m3) | DIST (m) | MAXIMUM 1-HR CONC (ug/m3) |
|---|---|---|---|
| 1.00 | 1.529 | 2525.00 | 0.3065E-01 |

| | | | |
|---|---|---|---|
| 25.00 | 1.660 | 2550.00 | 0.3024E-01 |
| 50.00 | 1.774 | 2575.00 | 0.2983E-01 |
| 75.00 | 1.870 | 2600.00 | 0.2944E-01 |
| 100.00 | 1.952 | 2625.00 | 0.2906E-01 |
| 125.00 | 1.953 | 2650.00 | 0.2868E-01 |
| 150.00 | 1.343 | 2675.00 | 0.2832E-01 |
| 175.00 | 1.051 | 2700.00 | 0.2796E-01 |
| 200.00 | 0.8871 | 2725.00 | 0.2761E-01 |
| 225.00 | 0.7648 | 2750.00 | 0.2727E-01 |
| 250.00 | 0.6686 | 2775.00 | 0.2693E-01 |
| 275.00 | 0.5915 | 2800.00 | 0.2660E-01 |
| 300.00 | 0.5285 | 2825.00 | 0.2628E-01 |
| 325.00 | 0.4763 | 2850.00 | 0.2597E-01 |
| 350.00 | 0.4323 | 2875.00 | 0.2566E-01 |
| 375.00 | 0.3949 | 2900.00 | 0.2535E-01 |
| 400.00 | 0.3629 | 2925.00 | 0.2506E-01 |
| 425.00 | 0.3348 | 2950.00 | 0.2477E-01 |
| 450.00 | 0.3106 | 2975.00 | 0.2448E-01 |
| 475.00 | 0.2890 | 3000.00 | 0.2420E-01 |
| 500.00 | 0.2701 | 3025.00 | 0.2393E-01 |
| 525.00 | 0.2533 | 3050.00 | 0.2366E-01 |
| 550.00 | 0.2380 | 3075.00 | 0.2340E-01 |
| 575.00 | 0.2242 | 3100.00 | 0.2314E-01 |
| 600.00 | 0.2119 | 3125.00 | 0.2289E-01 |
| 625.00 | 0.2007 | 3150.00 | 0.2264E-01 |
| 650.00 | 0.1905 | 3174.99 | 0.2240E-01 |
| 675.00 | 0.1811 | 3199.99 | 0.2216E-01 |
| 700.00 | 0.1725 | 3225.00 | 0.2192E-01 |
| 725.00 | 0.1645 | 3250.00 | 0.2169E-01 |
| 750.00 | 0.1572 | 3275.00 | 0.2147E-01 |
| 775.00 | 0.1505 | 3300.00 | 0.2124E-01 |
| 800.00 | 0.1442 | 3325.00 | 0.2103E-01 |
| 825.00 | 0.1384 | 3350.00 | 0.2081E-01 |
| 850.00 | 0.1329 | 3375.00 | 0.2060E-01 |
| 875.00 | 0.1278 | 3400.00 | 0.2039E-01 |
| 900.00 | 0.1231 | 3425.00 | 0.2019E-01 |
| 925.00 | 0.1186 | 3450.00 | 0.1999E-01 |
| 950.00 | 0.1145 | 3475.00 | 0.1979E-01 |
| 975.00 | 0.1105 | 3500.00 | 0.1960E-01 |
| 1000.00 | 0.1068 | 3525.00 | 0.1941E-01 |
| 1025.00 | 0.1033 | 3550.00 | 0.1922E-01 |
| 1050.00 | 0.1000 | 3575.00 | 0.1904E-01 |
| 1075.00 | 0.9691E-01 | 3600.00 | 0.1886E-01 |
| 1100.00 | 0.9396E-01 | 3625.00 | 0.1868E-01 |
| 1125.00 | 0.9114E-01 | 3650.00 | 0.1851E-01 |
| 1150.00 | 0.8845E-01 | 3675.00 | 0.1833E-01 |
| 1175.00 | 0.8591E-01 | 3700.00 | 0.1817E-01 |
| 1200.00 | 0.8349E-01 | 3724.99 | 0.1800E-01 |
| 1225.00 | 0.8118E-01 | 3750.00 | 0.1784E-01 |
| 1250.00 | 0.7900E-01 | 3775.00 | 0.1767E-01 |

| | | | |
|---|---|---|---|
| 1275.00 | 0.7691E-01 | 3800.00 | 0.1751E-01 |
| 1300.00 | 0.7491E-01 | 3825.00 | 0.1736E-01 |
| 1325.00 | 0.7300E-01 | 3850.00 | 0.1720E-01 |
| 1350.00 | 0.7118E-01 | 3875.00 | 0.1705E-01 |
| 1375.00 | 0.6943E-01 | 3900.00 | 0.1690E-01 |
| 1400.00 | 0.6776E-01 | 3925.00 | 0.1676E-01 |
| 1425.00 | 0.6616E-01 | 3950.00 | 0.1661E-01 |
| 1450.00 | 0.6463E-01 | 3975.00 | 0.1647E-01 |
| 1475.00 | 0.6316E-01 | 4000.00 | 0.1633E-01 |
| 1500.00 | 0.6174E-01 | 4025.00 | 0.1619E-01 |
| 1525.00 | 0.6037E-01 | 4050.00 | 0.1605E-01 |
| 1550.00 | 0.5905E-01 | 4075.00 | 0.1592E-01 |
| 1575.00 | 0.5779E-01 | 4100.00 | 0.1579E-01 |
| 1600.00 | 0.5657E-01 | 4125.00 | 0.1565E-01 |
| 1625.00 | 0.5539E-01 | 4149.99 | 0.1553E-01 |
| 1650.00 | 0.5425E-01 | 4175.00 | 0.1540E-01 |
| 1675.00 | 0.5315E-01 | 4200.00 | 0.1527E-01 |
| 1700.00 | 0.5209E-01 | 4225.00 | 0.1515E-01 |
| 1725.00 | 0.5106E-01 | 4250.00 | 0.1503E-01 |
| 1750.00 | 0.5007E-01 | 4275.00 | 0.1491E-01 |
| 1775.00 | 0.4912E-01 | 4300.00 | 0.1479E-01 |
| 1800.00 | 0.4819E-01 | 4325.00 | 0.1467E-01 |
| 1825.00 | 0.4730E-01 | 4350.00 | 0.1456E-01 |
| 1850.00 | 0.4643E-01 | 4375.00 | 0.1444E-01 |
| 1875.01 | 0.4559E-01 | 4400.00 | 0.1433E-01 |
| 1900.00 | 0.4478E-01 | 4425.00 | 0.1422E-01 |
| 1924.99 | 0.4399E-01 | 4450.00 | 0.1411E-01 |
| 1950.00 | 0.4322E-01 | 4475.00 | 0.1400E-01 |
| 1975.00 | 0.4248E-01 | 4500.00 | 0.1390E-01 |
| 2000.00 | 0.4176E-01 | 4525.00 | 0.1379E-01 |
| 2025.00 | 0.4106E-01 | 4550.00 | 0.1369E-01 |
| 2050.00 | 0.4038E-01 | 4575.00 | 0.1359E-01 |
| 2075.00 | 0.3972E-01 | 4600.00 | 0.1349E-01 |
| 2100.00 | 0.3908E-01 | 4625.00 | 0.1339E-01 |
| 2125.00 | 0.3881E-01 | 4650.00 | 0.1329E-01 |
| 2150.00 | 0.3819E-01 | 4675.00 | 0.1319E-01 |
| 2175.00 | 0.3759E-01 | 4700.00 | 0.1310E-01 |
| 2200.00 | 0.3701E-01 | 4725.00 | 0.1300E-01 |
| 2225.00 | 0.3644E-01 | 4750.00 | 0.1291E-01 |
| 2250.00 | 0.3589E-01 | 4775.00 | 0.1281E-01 |
| 2275.00 | 0.3535E-01 | 4800.00 | 0.1272E-01 |
| 2300.00 | 0.3482E-01 | 4825.00 | 0.1263E-01 |
| 2325.00 | 0.3431E-01 | 4850.00 | 0.1254E-01 |
| 2350.00 | 0.3381E-01 | 4875.00 | 0.1246E-01 |
| 2375.00 | 0.3333E-01 | 4900.00 | 0.1237E-01 |
| 2400.00 | 0.3285E-01 | 4925.00 | 0.1228E-01 |
| 2425.00 | 0.3239E-01 | 4950.00 | 0.1220E-01 |
| 2450.00 | 0.3194E-01 | 4975.00 | 0.1212E-01 |
| 2475.00 | 0.3150E-01 | 5000.00 | 0.1203E-01 |
| 2500.00 | 0.3107E-01 | | |

---

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

---

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

| CALCULATION PROCEDURE | MAXIMUM 1-HOUR CONC (ug/m3) | SCALED 3-HOUR CONC (ug/m3) | SCALED 8-HOUR CONC (ug/m3) | SCALED 24-HOUR CONC (ug/m3) | SCALED ANNUAL CONC (ug/m3) |
|---|---|---|---|---|---|
| FLAT TERRAIN | 1.960 | 1.960 | 1.960 | 1.960 | N/A |
| DISTANCE FROM SOURCE | 120.00 meters | | | | |
| IMPACT AT THE AMBIENT BOUNDARY | 1.529 | 1.529 | 1.529 | 1.529 | N/A |
| DISTANCE FROM SOURCE | 1.00 meters | | | | |

TITLE: SlattenRanch, operation

---

********** AREA PARAMETERS **********

---

| | | | | |
|---|---|---|---|---|
| SOURCE EMISSION RATE: | 0.288E-03 | g/s | 0.228E-02 | lb/hr |
| AREA EMISSION RATE: | 0.111E-07 | g/(s-m2) | 0.880E-07 | lb/(hr-m2) |
| AREA HEIGHT: | 3.00 | meters | 9.84 | feet |
| AREA SOURCE LONG SIDE: | 227.77 | meters | 747.28 | feet |
| AREA SOURCE SHORT SIDE: | 113.89 | meters | 373.65 | feet |
| INITIAL VERTICAL DIMENSION: | 1.50 | meters | 4.92 | feet |
| RURAL OR URBAN: | URBAN | | | |
| POPULATION: | 118453 | | | |
| INITIAL PROBE DISTANCE = | 5000. | meters | 16404. | feet |

---

********** BUILDING DOWNWASH PARAMETERS **********

---

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

---

********** FLOW SECTOR ANALYSIS **********

25 meter receptor spacing: 1. meters - 5000. meters

---

MAXIMUM IMPACT RECEPTOR

| Zo SECTOR | SURFACE ROUGHNESS | 1-HR CONC (ug/m3) | RADIAL (deg) | DIST (m) | TEMPORAL PERIOD |
|---|---|---|---|---|---|
| 1* | 1.000 | 0.3883 | 25 | 125.0 | WIN |

* = worst case diagonal

---

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Average Moisture
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 1.50
ROUGHNESS LENGTH: 1.000 (meters)

SURFACE FRICTION VELOCITY (U*) NOT ADUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 01 | 10 | 10 | 01 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| -1.30 | 0.043 | -9.000 | 0.020 | -999. | 21. | 6.0 | 1.000 | 1.50 | 0.35 | 0.50 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

********** AERSCREEN AUTOMATED DISTANCES **********
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

| DIST (m) | MAXIMUM 1-HR CONC (ug/m3) | DIST (m) | MAXIMUM 1-HR CONC (ug/m3) |
|---|---|---|---|
| 1.00 | 0.3041 | 2525.00 | 0.6094E-02 |

| | | | |
|---|---|---|---|
| 25.00 | 0.3302 | 2550.00 | 0.6012E-02 |
| 50.00 | 0.3528 | 2575.00 | 0.5933E-02 |
| 75.00 | 0.3719 | 2600.00 | 0.5855E-02 |
| 100.00 | 0.3881 | 2625.00 | 0.5778E-02 |
| 125.00 | 0.3883 | 2650.00 | 0.5704E-02 |
| 150.00 | 0.2670 | 2675.00 | 0.5631E-02 |
| 175.00 | 0.2090 | 2700.00 | 0.5560E-02 |
| 200.00 | 0.1764 | 2725.00 | 0.5490E-02 |
| 225.00 | 0.1521 | 2750.00 | 0.5422E-02 |
| 250.00 | 0.1329 | 2775.00 | 0.5355E-02 |
| 275.00 | 0.1176 | 2800.00 | 0.5290E-02 |
| 300.00 | 0.1051 | 2825.00 | 0.5226E-02 |
| 325.00 | 0.9470E-01 | 2850.00 | 0.5163E-02 |
| 350.00 | 0.8597E-01 | 2875.00 | 0.5102E-02 |
| 375.00 | 0.7852E-01 | 2900.00 | 0.5042E-02 |
| 400.00 | 0.7216E-01 | 2925.00 | 0.4983E-02 |
| 425.00 | 0.6659E-01 | 2950.00 | 0.4925E-02 |
| 450.00 | 0.6177E-01 | 2975.00 | 0.4869E-02 |
| 475.00 | 0.5748E-01 | 3000.00 | 0.4813E-02 |
| 500.00 | 0.5371E-01 | 3025.00 | 0.4759E-02 |
| 525.00 | 0.5036E-01 | 3050.00 | 0.4705E-02 |
| 550.00 | 0.4732E-01 | 3075.00 | 0.4653E-02 |
| 575.00 | 0.4459E-01 | 3100.00 | 0.4602E-02 |
| 600.00 | 0.4213E-01 | 3125.00 | 0.4552E-02 |
| 625.00 | 0.3991E-01 | 3150.00 | 0.4502E-02 |
| 650.00 | 0.3789E-01 | 3175.00 | 0.4454E-02 |
| 675.00 | 0.3602E-01 | 3200.00 | 0.4406E-02 |
| 700.00 | 0.3430E-01 | 3225.00 | 0.4360E-02 |
| 725.00 | 0.3272E-01 | 3250.00 | 0.4314E-02 |
| 750.00 | 0.3126E-01 | 3275.00 | 0.4269E-02 |
| 775.00 | 0.2992E-01 | 3300.00 | 0.4225E-02 |
| 800.00 | 0.2868E-01 | 3325.00 | 0.4181E-02 |
| 825.00 | 0.2752E-01 | 3350.00 | 0.4138E-02 |
| 850.00 | 0.2643E-01 | 3375.00 | 0.4097E-02 |
| 875.00 | 0.2542E-01 | 3400.00 | 0.4055E-02 |
| 900.00 | 0.2448E-01 | 3425.00 | 0.4015E-02 |
| 925.00 | 0.2359E-01 | 3450.00 | 0.3975E-02 |
| 950.00 | 0.2276E-01 | 3475.00 | 0.3936E-02 |
| 975.00 | 0.2198E-01 | 3500.00 | 0.3898E-02 |
| 1000.00 | 0.2124E-01 | 3525.00 | 0.3860E-02 |
| 1025.00 | 0.2055E-01 | 3550.00 | 0.3823E-02 |
| 1050.00 | 0.1989E-01 | 3575.00 | 0.3786E-02 |
| 1075.00 | 0.1927E-01 | 3600.00 | 0.3750E-02 |
| 1100.00 | 0.1869E-01 | 3625.00 | 0.3715E-02 |
| 1125.00 | 0.1812E-01 | 3650.00 | 0.3680E-02 |
| 1150.00 | 0.1759E-01 | 3675.00 | 0.3646E-02 |
| 1175.00 | 0.1708E-01 | 3700.00 | 0.3612E-02 |
| 1200.00 | 0.1660E-01 | 3724.99 | 0.3579E-02 |
| 1225.00 | 0.1614E-01 | 3750.00 | 0.3547E-02 |
| 1250.00 | 0.1571E-01 | 3775.00 | 0.3514E-02 |

| | | | |
|---|---|---|---|
| 1275.00 | 0.1529E-01 | 3800.00 | 0.3483E-02 |
| 1300.00 | 0.1490E-01 | 3825.00 | 0.3452E-02 |
| 1325.00 | 0.1452E-01 | 3850.00 | 0.3421E-02 |
| 1350.00 | 0.1415E-01 | 3875.00 | 0.3391E-02 |
| 1375.00 | 0.1381E-01 | 3900.00 | 0.3361E-02 |
| 1400.00 | 0.1347E-01 | 3925.00 | 0.3332E-02 |
| 1425.00 | 0.1316E-01 | 3950.00 | 0.3303E-02 |
| 1450.00 | 0.1285E-01 | 3975.00 | 0.3275E-02 |
| 1475.00 | 0.1256E-01 | 4000.00 | 0.3247E-02 |
| 1500.00 | 0.1228E-01 | 4025.00 | 0.3219E-02 |
| 1525.00 | 0.1200E-01 | 4050.00 | 0.3192E-02 |
| 1550.00 | 0.1174E-01 | 4075.00 | 0.3165E-02 |
| 1575.00 | 0.1149E-01 | 4100.00 | 0.3139E-02 |
| 1600.00 | 0.1125E-01 | 4125.00 | 0.3113E-02 |
| 1625.00 | 0.1102E-01 | 4150.00 | 0.3087E-02 |
| 1650.00 | 0.1079E-01 | 4175.00 | 0.3062E-02 |
| 1675.00 | 0.1057E-01 | 4200.00 | 0.3037E-02 |
| 1700.00 | 0.1036E-01 | 4225.00 | 0.3013E-02 |
| 1725.00 | 0.1015E-01 | 4250.00 | 0.2988E-02 |
| 1750.00 | 0.9957E-02 | 4275.00 | 0.2965E-02 |
| 1775.00 | 0.9767E-02 | 4300.00 | 0.2941E-02 |
| 1800.00 | 0.9583E-02 | 4325.00 | 0.2918E-02 |
| 1825.00 | 0.9405E-02 | 4350.00 | 0.2895E-02 |
| 1850.00 | 0.9233E-02 | 4375.00 | 0.2872E-02 |
| 1875.01 | 0.9066E-02 | 4400.00 | 0.2850E-02 |
| 1900.00 | 0.8904E-02 | 4425.00 | 0.2828E-02 |
| 1924.99 | 0.8747E-02 | 4450.00 | 0.2806E-02 |
| 1950.00 | 0.8595E-02 | 4475.00 | 0.2785E-02 |
| 1975.00 | 0.8447E-02 | 4500.00 | 0.2764E-02 |
| 2000.00 | 0.8304E-02 | 4525.00 | 0.2743E-02 |
| 2025.00 | 0.8165E-02 | 4550.00 | 0.2722E-02 |
| 2050.00 | 0.8030E-02 | 4575.00 | 0.2702E-02 |
| 2075.00 | 0.7899E-02 | 4600.00 | 0.2682E-02 |
| 2100.00 | 0.7772E-02 | 4625.00 | 0.2662E-02 |
| 2125.00 | 0.7718E-02 | 4650.00 | 0.2642E-02 |
| 2150.00 | 0.7595E-02 | 4675.00 | 0.2623E-02 |
| 2175.00 | 0.7476E-02 | 4700.00 | 0.2604E-02 |
| 2200.00 | 0.7360E-02 | 4725.00 | 0.2585E-02 |
| 2225.00 | 0.7247E-02 | 4750.00 | 0.2567E-02 |
| 2250.00 | 0.7137E-02 | 4775.00 | 0.2548E-02 |
| 2275.00 | 0.7029E-02 | 4800.00 | 0.2530E-02 |
| 2300.00 | 0.6925E-02 | 4825.00 | 0.2512E-02 |
| 2325.00 | 0.6823E-02 | 4850.00 | 0.2495E-02 |
| 2350.00 | 0.6724E-02 | 4875.00 | 0.2477E-02 |
| 2375.00 | 0.6627E-02 | 4900.00 | 0.2460E-02 |
| 2400.00 | 0.6533E-02 | 4925.00 | 0.2443E-02 |
| 2425.00 | 0.6441E-02 | 4950.00 | 0.2426E-02 |
| 2450.00 | 0.6351E-02 | 4975.00 | 0.2409E-02 |
| 2475.00 | 0.6263E-02 | 5000.00 | 0.2393E-02 |
| 2500.00 | 0.6178E-02 | | |

---

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

---

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

| CALCULATION PROCEDURE | MAXIMUM 1-HOUR CONC (ug/m3) | SCALED 3-HOUR CONC (ug/m3) | SCALED 8-HOUR CONC (ug/m3) | SCALED 24-HOUR CONC (ug/m3) | SCALED ANNUAL CONC (ug/m3) |
|---|---|---|---|---|---|
| FLAT TERRAIN | 0.3897 | 0.3897 | 0.3897 | 0.3897 | N/A |

DISTANCE FROM SOURCE 120.00 meters

| | | | | | |
|---|---|---|---|---|---|
| IMPACT AT THE AMBIENT BOUNDARY | 0.3041 | 0.3041 | 0.3041 | 0.3041 | N/A |

DISTANCE FROM SOURCE 1.00 meters

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

(949) 887-9013
mhagemann@swape.com

## Matthew F. Hagemann, P.G., C.Hg.

- **Geologic and Hydrogeologic Characterization, Investigation and Remediation Strategies**
- **Industrial Stormwater Compliance**
- **CEQA Review**
- **Expert Testimony**

**Professional Certifications:**
California Professional Geologist, P.G.
California Certified Hydrogeologist, C.Hg.

**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 Experience:**
30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. Spent nine years with the U.S. EPA in the Resource Conservation Recovery Act (RCRA) and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where I identified emerging threats to groundwater. While with EPA, I served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. 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, I developed extensive client relationships and has managed complex projects that include consultations as an expert witness and a regulatory specialist, and managing projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions held include:

Government:
Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);

Geologist, U.S. Forest Service (1986 – 1998).

Educational:
Geology Instructor, Golden West College, 2010 – 2104, 2017;
Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
Instructor, College of Marin, Department of Science (1990 – 1995).

Private Sector:
Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);
Executive Director, Orange Coast Watch (2001 – 2004);
Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, responsibilities have included:

- Lead analyst and testifying expert, for both plaintiffs and defendants, 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.
- Recommending 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 exposure to hazards from toxins.
- Stormwater analysis, sampling and best management practice evaluation, for both government agencies and corporate clients, at more than 150 industrial facilities.
- Serving as expert witness for both plaintiffs and defendants in cases including contamination of groundwater, CERCLAcompliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns, for both government agencies and corporate clients.
- Lead analyst and testifying expert in the review of environmental issues in license applicationsfor 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., 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.
- Lead author for a multi-volume remedial investigation report for an operating school in LosAngeles that met strict Sate of California regulatory requirements.
- Development of strategic approaches for cleanup of contaminated sites in consultation withclients and regulators.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, 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 included:

- Leading efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiating a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identifying 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, developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. 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, 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 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. Prepared geologic reports, conducted 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.

Served as a hydrogeologist with the RCRA Hazardous Waste program. Duties included:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliancewith 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, directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following:

- 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 Mexicoand 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 as senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advising the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinkingwater supplies.
- Shaping EPA's national response to these threats by serving on workgroups and by contributingto guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improving the technical training of EPA's scientific and engineering staff.
- Earning 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.
- Establishing national protocol for the peer review of scientific documents.

**Geology:**

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

- Mapping geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinating research with community stakeholders who were concerned with natural resource protection.
- Characterizing the geology of an aquifer that serves as the sole source of drinking water for thecity of Medford, Oregon.

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

Duties included the following:

- Supervising year-long effort for soil and groundwater sampling.
- Conducting aquifer tests.
- Investigating active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, 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.
- Part time geology instructor at Golden West College in Huntington Beach, California from 2010 to 2014 and in 2017.

***Summary of Testimony Experience Over Past Four Years***

*In Re New Jersey Department of Environmental Protection et al. vs. E.I. DuPont de Nemours and Company, in the United States District Court, District of New Jersey, Civil Action No. 1:19-cv-14766-RMB-JBC. Deposition in 2025. Representing Plaintiffs in matters regarding contamination of groundwater, wastewater, soil, and air with per- and poly-fluoroalkyl substances.*

*In Re Edmond Asher, et al., vs. RTX Corporation (f/k/a Raytheon Technologies Corporation, et al.) in the County of Huntington Superior Court, Indiana, Cause number 35D01-2006-CT-000338. Deposition in 2024. Representing Plaintiffs in matters regarding contamination of groundwater and soil vapor with trichlorethylene.*

*In Re Wright vs Consolidated Rail Corporation In the Circuit Court of Cook County, Illinois, Case No: 21L3966. Deposition in 2023, Representing Plaintiff in matters involving groundwater and drinking water contamination of perchloroethylene, trichlorethylene, 1,2-dichloroethane, and carbon tetrachloride.*

*In Re Behr Dayton Thermal Products LLC In the United States District Court for the Southern District of Ohio Western Division at Dayton, Case No: 08-cv-326. Deposition in 2022. Representing Plaintiff in matters regarding contamination of groundwater and indoor air with perchloroethylene and trichloethelene.*

*Orange County Water District vs. Sabic Innovative Plastics US, LLC, et al. In the Court of Appeal, Fourth District, Division 1, California, Case No: D070553. Deposition in 2020. Representing Plaintiff in matters involving compliance with The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).*

*Los Angeles Waterkeeper vs. AAA Plating and Inspection, Inc. In the United States District Court for the Central District of California, Case No: No. CV 18-5916 PA (GJSx). Deposition in 2019. Expert witness representing Plaintiff in matters involving contaminated stormwater runoff at an industrial facility in Compton, California.*

*Californians for Alternatives to Toxics vs. Schneider Dock and Intermodal Facility. In the United States District Court for the Northern District of California, Case No: 3:17-cv-05287-JST. Deposition in 2019. Expert witness representing Plaintiff in matters involving contaminated stormwater runoff at an industrial facility in Eureka, California.*

*Bells et al. vs. The 3M Company et al. In the United States District Court for the District of Colorado, Case No: 1:16-CV-02531-RBJ. Deposition in 2018. Expert witness representing Plaintiff on matters regarding the general hydrogeological conditions present in an area impacted by per- and poly-fluoroalkyl substances.*

*Ungar vs. Foundation for Affordable Housing. In the Superior Court, State of California, Los Angeles County, Case No. BC628890 Deposition in 2017. Expert witness representing defendant on matters involving alleged drinking water contamination.*

**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 andPublic Participation. Brownfields 2005, Denver, Coloradao.

**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 atschools in Southern California, Los Angeles.

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

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Waterin

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 Waterin 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 atribal EPA meeting, Pechanga, CA.

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

**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking WaterSupplies. 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 ofthe National Groundwater Association.

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

**Hagemann, M.F**., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to AddressImpacts 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 andState Underground Storage Tank Program managers.

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

**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 StorageTanks. Unpublished report.

**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water 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 WatercraftUsage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George WrightSociety 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 AirStation, 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**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Airand Waste Management Association Publication VIP-61.

**Hagemann, M.F**., 1994. Groundwater Characterization and Cleanup at Closing Military Basesin 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.

---

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

**SOIL WATER AIR PROTECTION ENTERPRISE**
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
**Email:** prosenfeld@swape.com

# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**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. Focus on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years of 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 $H_2O$ 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:

**Rosenfeld, P.E**., Spaeth, K.R., McCarthy, S.J. *et al.* Camp Lejeune Marine Cancer Risk Assessment for Exposure to Contaminated Drinking Water From 1955 to 1987. *Water Air Soil Pollut* **235**, 124 (2024). https://doi.org/10.1007/s11270-023-06863-y.

**Rosenfeld P.E.,** Spaeth K.R., Remy L.L., Byers V., Muerth S.A., Hallman R,C., Summers-Evans J., Barker S. (2023) Perfluoroalkyl substances exposure in firefighters: Sources and implications, *Environmental Research*, Volume 220, https://doi.org/10.1016/j.envres.2022.115164.

**Rosenfeld P.E.** and Spaeth K.R., (2023) Authors' Response to Letter to the Editor from Bullock and Ramacciotti, *Water Air Soil Pollution* Volume 234, https://doi.org/10.1007/s11270-023-06165-3

**Rosenfeld P. E.,** Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution.* **233,** 171.

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 Aermod 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.

Cheremisinoff, N.P., **Rosenfeld, P.E.** Davletshin, A.R. (2008). ***Responsible Care***. Gulf Publishing. Texas.

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., Sellew, 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 affects 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. Master's 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. Bachelor's 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). Perfluoroctanoic Acid (PFOA) and Perfluoroactane 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 at 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 Conferenc*e. 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. The 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 the 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 the 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 the 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 District Court of Harris County Texas
Mt Davis Interest, Inc v Sesco Cement Corp
Cause No 2023-26512
Trial 6-6-2-25

In the United States Southern District of New York
Gallo vs Avon Products Inc., et al
Civil Action No.: 1:23-cv-2023
Deposition 4-24-2025

In Vanderburgh Superior Court 5, County of Vanderburgh, Indiana
Markello v CSX
Civil Action No 82D05-2011-CT-004962
Deposition 3-26-25

Iin the Circuit Court of Cook County Illinois
Jarosiewicz v Northeast Regional Railroad
Case No 2023 L 002290
Deposition 2-27-25

In the District Court 191st Judicial District Dallas County
Acklin v Poly America International
Cause No DC-22-08610
Deposition 1-8-2025

United States District Court, Norther District of California
Asustin Vs Monsanto
Case No 2:23-cv-272
Deposition 12-20-25

In Jefferson Circuit Court Division One, Louisville, Kentucky
Stafford vs, CSX
Case No. 18-CI-001790

Deposition: 8-27-24

In the Twenty-Second Judicial Circuit of St. Louis. State of Missouri
Patricia Godfrey vs, Amtrak
Case No. 2122-CC-00525
Deposition: 7-17-24

In the Circuit Court of Jefferson County Alabama
Linda Early Vs. CSX
Case number CV-2021-00241
Deposition 6-24-24

In the Court of Common Please Lucas County, Ohio
Brenda Conkright vs. CSX
Case No. G-4801-CI-0202102664-000
Deposition: 6-4-24

In the Commonwealth of Kentucky, Greenup Circuit Court
Patsy Sue Napier vs. CSX
Case No. 19-CI-0012
Deposition: 5-8-2-24

In United States District Court of Hawaii
Patrick Feindt, Jr. et al. vs. The United States of America
Case No. 1:22-cv-LEK-KJM
Trial 3-29-24 and 4-5-24

In the District Court of Hood County State of Texas
Artie Gray vs. Exxon Mobil
Case No. C-2018047
Rosenfeld Deposition:4-22-2024

In the Elkhart Superior Court State of Indiana
Estate of Clark Stacy vs. Penn Central Corporation
Cause No 2D01-2001-CT-00007
Rosenfeld Deposition 1-25-2024 and 3-7-2024

In the Circuit Court of Trempealeau County, State of Wisconsin
Michael J. Sylla et al. vs. High-Crush Whitehall LLC
Case No. 2019-CV-63, 2019-CV-64, 2019-CV-65, 2019-CV-66
Rosenfeld Deposition: 3-5-2024

In the Circuit Court of Trempealeau County, State of Wisconsin
Leland Drangstveit vs. High-Crush Blair LLC
Case No. 19-CV-66
Rosenfeld Deposition 3-5-2024

In the Circuit Court of Jefferson County Alabama
Donald Lee Ashworth vs. CSX Transportation Inc.
Case No CV-2021-901261
Rosenfeld Deposition 1-23-2024

In the United States District Court for the Eastern District of Wisconsin
Gary L Siepe vs. Soo Line Railroad
Case No. 2:21-cv-00919
Rosenfeld Deposition 1-19-2024

In the United States District Court for the Western District of Louisiana
Ricky Bush v. Clean Harbors Colfax LLC
Case No. 1:22-cv-02026-DDD-JPM
Rosenfeld Deposition 12-18-2023 and 1-15-2024

In United States District Court of Hawaii
Patrick Feindt, Jr. et al. vs. The United States of America
Case No. 1:22-cv-LEK-KJM
Rosenfeld Deposition 11-29-2023

In the Circuit Court for the Twentieth Judicial Circuit St. Clair County, Illinois
Timothy Gray vs. Rural King et al.
Case No 2022-LA-355
Rosenfeld Deposition 9-26-2023

In United States District Court Eastern District of Wisconsin
Gary L. Siepe vs. Soo Line Railroad Company
Case No. 2:21-cv-00919
Rosenfeld Deposition 9-15-2023

In the Circuit Court of Cook County Illinois
Donald Fox vs. BNSF
Case No. 2021 L12
Rosenfeld Deposition 9-12-2023

In the Court of Common Please Cuyahoga County, Ohio
Thomas Schleich vs. Penn Central Corporation
Lead Case No. CV-20-939184
Rosenfeld Deposition 8-27-2023

In the Circuit Court of Jackson County Missouri at Kansas City
Timothy Dalsing vs. BNSF
Case No. No. 2216-cv06539
Rosenfeld Deposition 7-28-2023

In the United States District Court for the Southern District of Texas Houston Division
International Terminals Company LLC Deer Park Fire Litigation
Lead Case No. 4:19-cv-01460
Rosenfeld Deposition 7-25-2023

In the Circuit Court of Livingston County Missouri
Shirley Ralls vs. Canadian Pacific Railway and Soo Lind Railroad
Case No. 28LV-CV0020
Rosenfeld Daubert Hearing 7-18-2023 Trial Testimony 7-19-2023

In the Circuit Court of Cook County Illinois
Brenda Wright vs. Penn Central and Conrail
Case No. No. 2032L003966
Rosenfeld Deposition 6-13-2023

In the Circuit Court Common Please Philadelphia of Jefferson County Alabama
Frank Belle vs. Birmingham Southern Railroad Company et al.
Case No. 01-cv-2021-900901.00
Rosenfeld Deposition 4-6-2023

In the Circuit Court of Jefferson County Alabama
Linda De Gregorio vs. Penn Central
Case No. 002278
Rosenfeld Deposition 3-27-20203

In the United States District Court Eastern District of New York
Rosalie Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-16-2023

In the Superior Court of Washington, Spokane County
Judy Cundy vs. BNSF
Case No. 21-2-03718-32
Rosenfeld Deposition 3-9-2023

In The Court of Common Pleas of Philadelphia County, PA Civil Trial Division
Feaster v Conrail
Case No. 001075
Rosenfeld Deposition 2-1-2023

In United States District Court for the Central District of Illinois
Sherman vs. BNSF
Case No. 3:17-cv-01192
Rosenfeld Deposition 1-18-2023

In United States District Court District of Colorado
Gonzales vs. BNSF
Case No. 1:21-cv-01690
Rosenfeld Deposition 1-17-2023

In United States District Court District of Colorado
Abeyta vs. BNSF
Case No. 1:21-cv-01689-KMT
Rosenfeld Deposition 1-3-2023

In United States District Court For The Easter District of Louisiana
Nathaniel Smith vs. Illinois Central Railroad
Case No. 2:21-cv-01235
Rosenfeld Deposition 11-30-2022

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division

Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022

In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022, Trial 1-10-2023

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation

Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021

In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

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

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

In the United States District Court For the Northern District of Illinois

Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al. vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. 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 vs. CNA Insurance Company et al.
Case No. 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 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. 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. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs 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., Plaintifs 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., Plaintifs, vs. Meritor Inc., et al., Defendants
Case No. 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. 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. vs. 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 No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, vs. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 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 County of Kern, Unlimited Jurisdiction
Rose Propagation Services vs. Heppe Enterprises
Case No. S-1500-CV-278190, LHB
Rosenfeld Deposition: May 2014

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

In the Court of Galveston County, Texas 56th Judicial District
MDL Litigation Regarding Texas City Refinery Ultracracker Emission Event Litigation
Cause No. 10-UC-0001
Rosenfeld Deposition: March 2013
Rosenfeld Trial: September 2013

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs,* vs. BP Products North America, Inc., *Defendant.*
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the United States District court of Southern District of California
United States of America, Plaintiff vs. 2,560 Acres of Land, more or less, located in Imperial County, State of California; and Donald L. Crawford, et. al.
Civil No. 3:11-cv-02258-IEG-RBB
Rosenfeld Deposition: December 2012, January 2013

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

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.

# EXHIBIT B

WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
NEW YORK

WI #25-001

August 18, 2025

Alaura R. McGuire
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

**SUBJECT:** **Slatten Ranch Townhomes Section 15183 Consistency Memorandum**
**Antioch, CA**
**Response to Staff Report Comments**

Dear Ms. McGuire

As requested, we have reviewed the Staff Report agenda item 6-2 for the August 20, 2025 Planning Commission meeting in Antioch, California. The Staff Report includes a response to our letter dated July 12th, 2024, regarding our belief that the noise impact analysis for the Slatten Ranch Townhomes Project in Antioch, CA has the potential to create significant impacts from construction noise and construction vibration on the surrounding community that are peculiar to the Project.

The City's response to comment 1-8 states that a "noise attenuation study is not required, as the City has determined that the project would not result in a significant increase in noise and because the project is not located in an area exceeding the General Plan noise standards." The Housing Element EIR claims that compliance with General Plan Policy 11.8.2 would ensure impacts remain less than significant. However, Policy 11.8.2 states that for developments in areas exceeding the noise levels identified in the General Plan noise objectives, or where the development of proposed uses could result in a significant increase in noise, General Plan Policy 11.8.2(f) requires a detailed noise attenuation study to be prepared by a qualified acoustical engineer to determine appropriate mitigation and ways to incorporate such mitigation into project design and implementation. (Housing Element pg. IV.L-13). The City has not provided any evidence to demonstrate that the Project will not exceed General Plan noise objectives or require a noise attenuation study.

Specifically, no baseline noise measurements were taken. Baseline noise measurements are the preferred way to determine background noise sources. Noise measurements are required to determine if General Plan noise objectives are exceeded because they provide objective, site-specific data on existing and potential sound levels in the community. General Plan noise objectives are established to protect public health, safety, and quality of life, but these objectives cannot be meaningfully evaluated without quantifiable information. Noise impacts vary depending on surrounding land uses, traffic volumes, building design, and other environmental factors, making actual measurements necessary to assess compliance with established thresholds. Without reliable measurements, the City risks relying on assumptions that may underestimate or overstate impacts,

leading to flawed planning decisions and inadequate mitigation, in addition to no proof that the project does not result in a significant increase in noise.

The City also failed to address the Project's peculiar construction noise and vibration. Our previous letter demonstrated how construction noise could reach as high as 79 dBA, and construction vibration could reach as high as 0.05 in/sec PPV. These have the potential to create significant impacts compared to reasonable criteria for daytime construction noise and human response to vibration.

For construction noise, General Plan Policy 11.8.2 "requires development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan and requires that all construction equipment utilize noise reduction features" Additionally, the construction-related noise mitigation plan should "depict the location of construction equipment and how the noise from this equipment will be mitigated during construction through the use of noise reduction methods" that are listed in General Plan Policy 11.8.2 (m) (DEIR page IV.L-12).

The City's response to comment 1-9 details several design guidelines that reduce noise. None of these are guaranteed to reduce noise and depend on the unique characteristics of each site. 'Noise reduction features are already included in construction noise source models of the cited FTA database, which takes its source values from measurements of modern equipment already equipped with mufflers. Nighttime construction restrictions do not mitigate daytime noise levels. Strategic staging will reduce the length of unnecessary noise impacts, but will not mitigate the worst-case construction noise scenarios when necessary activities occur adjacent to sensitive uses.

The Staff Report states that any "proposed development adjacent to occupied noise sensitive land uses shall implement a construction-related noise mitigation plan that depicts the location of construction equipment storage and maintenance areas, and documents methods to be employed to minimize noise impacts on adjacent noise sensitive land uses." A construction-related noise mitigation plan alone is not sufficient to reduce impacts under CEQA guidelines because CEQA requires that all feasible mitigation measures be identified, analyzed, and implemented to the extent possible—not just as broadly planned. A plan submitted after project approval does not ensure that noise impacts will actually be reduced to less-than-significant levels, since effectiveness depends on site-specific conditions, timing, equipment, and enforcement. CEQA requires substantial evidence demonstrating that proposed measures will meaningfully reduce noise exposure; simply adopting a mitigation plan without quantifying reductions or evaluating feasibility leaves uncertainty about whether impacts are adequately addressed. In other words, compliance with CEQA is based on demonstrated effectiveness, not on the existence of a plan alone.

Therefore, the City fails to adequately address my previous comments related to the 15183 Consistency Memo's inadequate noise impact analysis. The City fails to establish baseline noise measurements or conduct a noise attenuation study to properly identify potentially significant noise impacts peculiar to the Project or Project site. The City also fails to adequately address the Project's significant and peculiar construction noise and vibration impacts, which must be analyzed in an EIR prior to Project approval.

Very truly yours,
WILSON IHRIG

Jack Meighan
Associate

meighan - slatten ranch response to staff report comments.docx

# EXHIBIT C

794 Sawnee Bean Road
Thetford Center VT 05075

Norman Marshall, President
(802) 356-2969

nmarshall@smartmobility.com

August 18, 2025

Alaura McGuire
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

**Subject: Slatten Ranch Townhomes**

Dear Ms. McGuire,

In July 2025, I reviewed the Slatten Ranch Townhomes Section 15183 Consistency Memorandum ("Memorandum") dated February 2024 and the Staff Report for the Antioch Planning Commission Meeting of July 16, 2025. I made the following findings regarding the City's vehicle miles traveled (VMT) impact analysis:

1) The City of Antioch's Housing Element EIR identifies the project location as being in an area with Home-Based VMT exceeding the threshold. The project is therefore likely to have significant VMT impacts.

2) Housing Element Measure TRANS-1 requires: "Individual housing project development proposals that do not screen out from VMT impact analysis shall provide a quantitative VMT analysis." A quantitative VMT analysis required for this project.

3) Housing Element Measure TRANS-1 further requires: "Projects which result in a significant impact shall include travel demand management measures and physical measures to reduce VMT to a less-than-significant level." If the quantitative VMT analysis finds a significant VMT impact for the proposed project, mitigation is required to reduce VMT to less than a significant level.

Now, I also have reviewed the Staff Report for the Antioch Planning Commission Meeting of August 20, 2025. The Transportation section in the Staff Report has been rewritten from the July 16, 2025 version with the changes shown as Response to Comment 1-4 (PDF p. 183 of 189). However, these changes are mostly editorial reordering that does not resolve the issues I identified in my July comments.

My comment #1 that the project would likely result in significant VMT impacts is not addressed in the revisions.

The revised Staff Report reiterates the same rationale for not performing a quantitative VMT analysis, i.e., that it is exempted pursuant to CEGA Guidelines Section 15183, and in particular that "impacts related to VMT are not peculiar to the project site or project and have been addressed as a significant effect in the Housing Element EIR." (PDF p. 183 of 189)

My July comments address this argument, and I copy a portion of my July comments here:

> This misapplies Section 15183. The Housing Element EIR does not exempt all Housing Element Inventory sites from VMT analysis. Instead, it explicitly states that some of the sites in the Housing Element Inventory would result in significant VMT impacts that must be quantified and mitigated. Mitigation Measure TRANS-1 provides:
>
> **Individual housing project development proposals that do not screen out from VMT impact analysis shall provide a quantitative VMT analysis using the methods applied in this EIR . .**
>
> **Projects which result in a significant impact shall include travel demand management measures and physical measures to reduce VMT to a less-than-significant level.**
>
> There is no reasonable reading of the Housing Element EIR that exempts all of the sites in the Inventory from CEQA or that exempts them from the analysis and mitigation required by Measure TRANS-1.
>
> A quantitative VMT analysis is required for this project. If the quantitative VMT analysis determines that there will be a significant impact – as appears highly likely given the FEIR mapping – travel demand management measures are required to reduce VMT to less than a significant level.

The Staff Report position appears to be since the collection of sites in the Housing Element EIR resulted in a significant VMT impact, any other site that may or may not result in a significant VMT impact is exempt from analysis. This position is contradicted by the Housing Element EIR text reproduced above that explicitly requires "quantitative VMT analysis" for projects that are not screened out.

A quantitative VMT analysis is required for this project. If the quantitative VMT analysis determines that there will be a significant impact – as appears highly likely given the FEIR mapping – travel demand management measures are required to reduce VMT to less than a significant level. The revised Staff Report fails to require or even suggest significant VMT mitigation in accordance with Housing Element FEIR Measure TRANS-1 which states:

> TRANS-1: Implement VMT Reduction Measures. Individual housing project development proposals that do not screen out from VMT impact analysis shall provide a quantitative

VMT analysis using the methods applied in this EIR, with modifications if appropriate based on future changes to City of Antioch practices and CCTA VMT analysis methodology guidelines. Projects which result in a significant impact shall include travel demand management measures and physical measures to reduce VMT to a less-than-significant level. Measures may include, but are not limited to, those described below, which have been identified as potentially VMT reducing in the California Air Pollution Control Officers Association (CAPCOA) Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity. Potential VMT reduction estimates are included below, but detailed requirements, calculation steps, and limitations are described in the CAPCOA Handbook. In addition, application of one or more measures is generally expected to result in a net VMT reduction of 10 percent or less for development projects in suburban settings such as Antioch.

- Unbundle parking costs (i.e., sell or lease parking separately from the housing unit). Effectiveness: up to 15.7 percent reduction in GHG from VMT per the CAPCOA Handbook.
- Provide car-sharing, bike sharing, or scooter sharing programs. Effectiveness: 0.15 to 0.18 percent reduction in GHG from VMT for car share, 0.02 to 0.06 percent for bike share, and 0.07 percent for scooter share, per the CAPCOA Handbook. The higher car share and bike share values are for electric car and bike share programs.
- Subsidize transit passes for residents of affordable housing. Effectiveness: up to 5.5 percent reduction in GHG from VMT per the CAPCOA Handbook.

In addition to the on-site measures noted above, individual housing projects that are above the VMT threshold could potentially contribute to future VMT mitigation fee programs, banks, or exchanges. No regional VMT mitigation programs currently exist; however, the CCTA is currently evaluating different mitigation program frameworks which may lead to a Countywide or sub-regional VMT mitigation program. Should such a program be implemented, development projects could potentially pay into a fee program or purchase mitigation credits to achieve needed VMT mitigation instead of, or in addition to, on-site TDM measures. (p. III-3 – III-4)

The August 2025 Staff Report includes a new condition:

> Pursuant to Housing Element EIR Mitigation Measure TRANS-1, the project shall reduce VMT to the extent feasible in light of project objectives and the nature of the project, and a quantitative VMT analysis shall be submitted for review and approval with the improvement plans for approval by the Community Development Director." (PDF p. 88 of 189)

This condition moves the goalposts in two fundamental and unacceptable ways. First, the Housing Element EIR requires that VMT be reduced to "a less than significant level."[1] The Staff Report condition substitutes a much less stringent standard, "to the extent feasible." Second, under the new condition, the determination as to whether VMT has been adequately reduced has been deferred until after Project approval. This prevents full public and Planning Commission review and instead relies on a check off by a single staff person.

Sincerely,

Norman L. Marshall

Norman L. Marshall

[1] Housing Element EIR, p. II-6.