

June 8, 2020

Dear City of San Jose Mayor Liccardo and City Council Members Jones, Jimenez, Peralez, Diep, Carrasco, Davis, Esparza, Arenas, Foley, and Khamis,

On June 9th, you will vote - under item 5.1 - on whether or not staff shall pursue the Charcot Extension project near Orchard School in San Jose. We would like to share the findings from an 11 week long research project conducted by four students in early 2020.

We are a group of graduating seniors (class of 2020) from Santa Clara University. In winter quarter 2020, we took a senior capstone class taught by Professor Christopher Bacon in the Department of Environmental Studies and Sciences. This class works with community-based partners on projects defined in collaboration with local partners as students are guided by faculty to conduct original research with our partners, while also getting a hands-on opportunity to put their interdisciplinary skills and knowledge areas to work on pressing real world challenges. The projects are the primary focus of our work for 11 weeks.

We conducted a scientific literature review, collaborative meetings with staff and parents at Orchard Elementary, and then developed and implemented an air pollution research campaign. Specifically we measured Ultrafine Particulate Matter (UFP) on Orchard Campus using a CPC 3007 device to gain insights into the current air pollution measures. We measured UFP concentrations at six separate locations for 10 minute intervals within Orchard campus twice a week for three weeks. In addition to air pollution, we took traffic counts of all vehicles passing Orchard along Silk Wood Lane, Oakland Road, and Fox Lane. See the diagram below for a map of our sampling locations.

Motorized vehicle traffic is one of the most significant contributors to air pollution, especially in California. Fuel burning vehicles and other generators produce the minute airborne particles PM<sub>10</sub>, the largest of the three, PM<sub>2.5</sub>, the middle, and ultrafine air pollution particles (UFPs) that are around 0.1 micron in diameter or about one-thousandth the width of a human hair. While UFPs are important components of PM<sub>2.5</sub>, **the effects of UFPs are just beginning to be documented as *more toxic* than larger particulates, especially for vulnerable populations like *children*** (US EPA, 2009<sup>1</sup>). Because UFPs are so small, humans have inadequate natural defenses; the particles can quickly enter into the respiratory system and bloodstream to harm organs (Polidori et al., 2012<sup>2</sup>). Among children, **UFPs are associated with incident wheezing, asthma, lower spirometric values, and asthma-related emergency visits** (Heinzerling et al., 2016<sup>3</sup>). According to California's EnviroScreen 3.0 Maps, Orchard School is located in a census tract that is highly exposed to traffic related pollutants (ranked as

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<sup>1</sup> US EPA (2009). Integrated Science Assessment: Final Report. National Center for Environmental Assessment- RTP Division, Office of Research and Development, U.S. EPA.

<sup>2</sup> Polidori, A., Fine, P. M., White, V., & Kwon, P. S. (2012). Pilot study of high-performance air filtration for classroom applications. *Indoor Air*, 23(3), 185–195.

<sup>3</sup> Heinzerling, A., Hsu, J., & Yip, F. (2016). Respiratory Health Effects of Ultrafine Particles in Children: A Literature Review. *Water, air, and soil pollution*, 227, 32.

more polluted than 88% of the census tracts in CA), including diesel particulates (92%) and PM2.5 (53%) ([OEHHA](#), 2017<sup>4</sup>). Since Orchard is located next to a busy freeway and main expressway that exposes the school to emissions from thousands of vehicles a day, a key strategy to reduce health risks to children is to reduce their exposure to traffic related air pollution.

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<sup>4</sup> OEHHA. (2017). CalEnviroScreen 3.0.



Figure 1: Data Collection Map.

Air pollution data collection map of Orchard School and surrounding area. Casa de Lago Mobile Home Park locations include: (1) Front Office; (2) Laguna Dr. and Arroyo Dr. intersection; (3) Laguna Dr. and Buena Vista Dr. intersection; (4) Laguna Dr. and Fountain Circle intersection; (5) Arroyo Dr. closest to the edge of the park; and (6) Creekside Dr. and Westwood Dr. intersection. Orchard School District locations include: (7) Oakland Rd. and Fox Ln. intersection; (8) Front Office on Fox Ln.; (9) inside classroom #46; (10) the baseball diamond; (11); the playground near Silk Wood Ln.; and (12) the steps of the event center.

After our data collection campaign, our analysis found that average UFP concentrations at Orchard per sampling location are higher than 20,000 #/cc (particles per cubic centimeter). This number exceeds a known, research-backed threshold of 18,230 #/cc that impacts children’s asthma rates at school ([Heinzerling et al., 2016<sup>5</sup>](#)). The below graph depicts our air pollution findings per sampling location over the three week period.

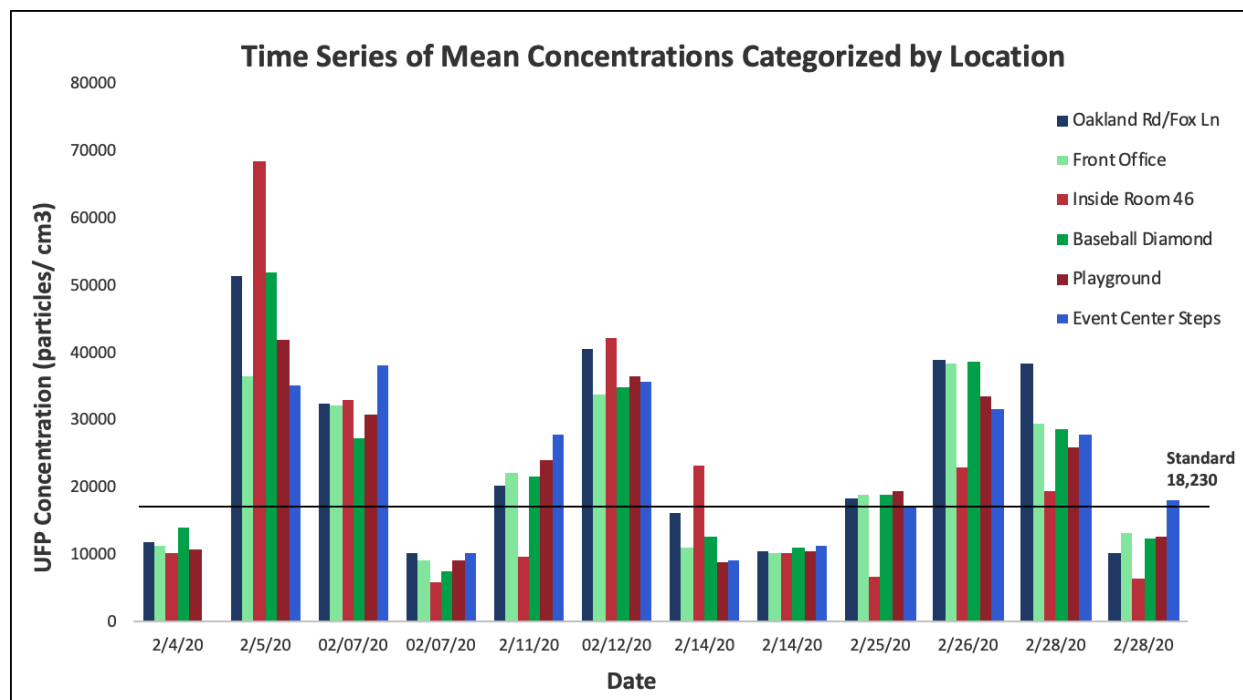


Figure 2: Air Pollution Averages by Date and Location in OSD.

Source: CPC Data Collection January-February 2020

**Almost all of the days we recorded experienced ufp levels above our recommended.** This above graph, however, does not depict the “spikes” or maximums that were hit at each location, which are included in the following figure and more accurately describe the total duration each location experienced extra high ufp levels, which we define as greater than 40,000 #/cc.

<sup>5</sup> Heinzerling, A., Hsu, J., & Yip, F. (2016). Respiratory Health Effects of Ultrafine Particles in Children: A Literature Review. *Water, air, and soil pollution*, 227, 32.

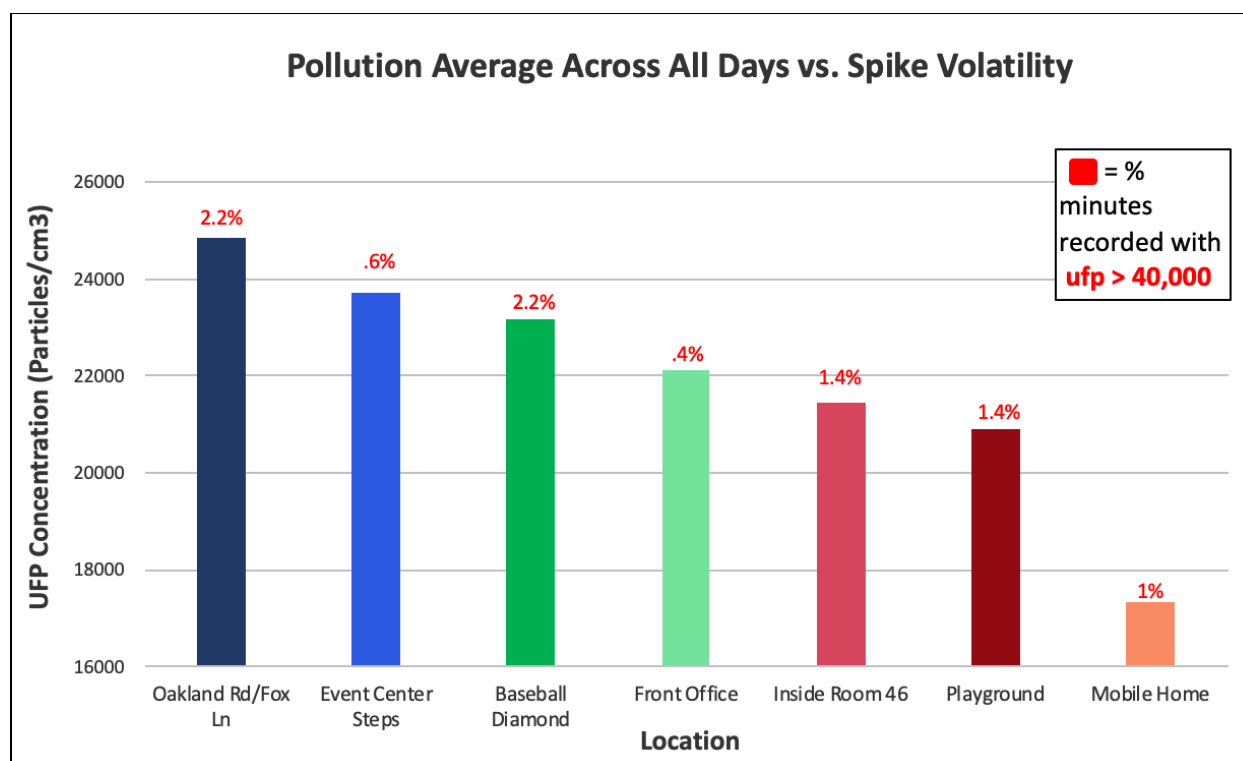


Figure 3: Air Pollution Total Average Concentrations by Location vs. Spike Count  
Source: CPC Data Collection January-February 2020

The above graph depicts overall pollution averages across all recorded days, categorized by location, in order from locations experiencing the highest UFP averages to locations experiencing the lowest ufp average concentrations. In general, **all school locations experienced a similar range of UFP concentrations between 20,800-24,861 #/cc. This range alone exceeds the threshold found by Heinzerling (2016)<sup>6</sup> which correlated the high UFP concentration of 18,230 #/cc with greater asthma rates.**

This health risk is especially concerning because children's lungs are not as fully developed as adults', leaving them vulnerable to ambient air pollution during crucial periods of physical and psychological development which can **lead to lifelong negative health impacts.**

We acknowledge that this is preliminary research. However, our research still raises **causes for concern.** From our research, Orchard Elementary is **presently burdened by high rates of air pollution that raises concerns for children's health issues and the risk that this project would exacerbate existing environmental injustices.**

The census tract Orchard Elementary is located in is populated by 82% people of color and is in the 95th percentile for pollution burden. Orchard Elementary itself consists of 94% students of color and 48% of students qualify for free or reduced lunch ([Ed-Data](#)<sup>7</sup> & [Public School Review](#)<sup>8</sup>,

<sup>6</sup> Heinzerling, A., Hsu, J., & Yip, F. (2016). Respiratory Health Effects of Ultrafine Particles in Children: A Literature Review. *Water, air, and soil pollution*, 227, 32.

<sup>7</sup> Education Data Partnership. (2020). District Summary: Orchard Elementary.

<sup>8</sup> Public School Review. (2020). Orchard Elementary School Profile: San Jose, CA.

2020). **Couple these demographics with the existing high levels of air pollution and the result is a community disproportionately affected by the negative effects of existing pollution. As a result, the approval of the Charcot Extension project brings further cause for concern for the future pollution experienced by Orchard community members.**

In other words, while **today's** pollution levels for the Orchard community is high, the implementation of the Charcot Extension threatens an increase in **tomorrow's** pollution levels.

Those in positions of power not only have the civic duty, but also the **social and moral obligations to protect the most vulnerable and disadvantaged community members**. We understand that you are also concerned about improving traffic flow, but there are alternatives to this expansion that could achieve similar results and we still need to assess the impacts of Covid-19 on future traffic flows. From the urban planning literature we also know that adding new lanes generally results in more traffic and does not significantly reduce congestion. As a group of students, we are concerned that **the approval of the Charcot Extension Project would fail to protect the children at Orchard Elementary and in the surrounding community**. We also sense that it would **undermine the community's hard fought sustainability efforts** which now have significant momentum. Finally, our analysis of survey data and conversations with residents suggests that a decision to approve the project as it stands could significantly decrease their trust and sense of justice in San Jose City governance.

We kindly ask that you view our attached final report, capstone poster, and final project presentation. If you have any questions you are welcome to contact the student team coordinator Cory Mason Gong, [cgong@scu.edu](mailto:cgong@scu.edu) and the instructor for the class, Professor Christopher Bacon, PhD Associate Professor of Environmental Studies, at [cbacon@scu.edu](mailto:cbacon@scu.edu).

Thank you for your time and consideration for the many families and children of San Jose.

Cory Mason Gong ([cgong@scu.edu](mailto:cgong@scu.edu)), Environmental Studies and Psychology '20

Olivia Fitzpatrick, Environmental Studies & Political Science '20

Katherine Angell, Environmental Studies & Economics '20

Juliette Levy, Environmental Studies & Theater '20

## Final Report Executive Summary

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Air pollution has a tangible and undeniable affect on human health, specifically on the lung development of children and the development of respiratory ailments such as asthma. Oftentimes, such pollution is caused by traffic density and a lack of mitigation strategies to combat the resulting issues. In an effort to further understand such impacts on children's health, this project measured air pollution levels around the Orchard School District and analyzed the results. We ultimately found that the air pollution levels around the Orchard School are higher than the average to which we compared the measurements, and that current levels of air pollution (UFPs) at Orchard School exceed the threshold associated with known health impacts in children. Furthermore, the City of San Jose plans to implement the Charcot Extension Project, which would extend Charcot Avenue and cut right through part of the Orchard School property. The project would increase traffic density in the area and potentially further inhibit the healthy lung growth of the students at the school. In order to further understand the community's perceptions on this project plan, we conducted a 25 question online survey, of which the community members' participation was completely voluntary. Overall, we found that community members of Orchard School have negative perceptions on air pollution, and are aware of health issues that it can bring. In addition, we also found that community members are aware of the Charcot Extension Project, understand its goals and plans, and are still adamantly against its construction. In conclusion, we recommend that the community of Orchard School continue to facilitate a space with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project. We also recommend that Orchard School begins to further research and integrate mitigation strategies now to better the current air quality.





# AIR POLLUTION IN THE ORCHARD SCHOOL DISTRICT & THE CHARCOT EXTENSION PROJECT: A RESPONSE

Katherine Angell, Olivia Fitzpatrick, Cory Gong, & Juliette Levy

Environmental Studies & Sciences: Environmental and Food Justice Capstone, Santa Clara University



Final Poster

## INTRODUCTION

Clean air is important for the physical and cognitive development of children. Many schools, especially those serving low-income and non-white communities, are situated next to major roadways (Pastor et al., 2006). One in every 11 public schools in the U.S. is located within 500 ft. of roads with significant traffic, exposing roughly 4.4 million students to toxic air pollution that can have major negative health impacts (Hopkins, 2017). Moreover, schools where more than 75% of the students are racial minorities and/or are eligible for free or reduced-price lunches are 3x more likely to be located near a busy road than schools where demographics are reversed (Hopkins, 2017). Many schools across the nation are creating movements demanding mitigation of such injustices. One such school is Orchard School District (OSD) in San José, CA. OSD consists of 94% students of color, 46% of its students qualify for free or reduced lunch, and it is squeezed in between highway 880 and Oakland Road, a major arterial 7-lanes wide.



Figure 1A: Orchard School District Location.

The City of San José plans to build the Charcot Avenue Extension project, a new city road expansion. Implementing this project would cut through the school, bring an additional 14,000 cars next to the school, increase air pollution, and contribute to noise and safety issues (Figure 1B). In response, The Bay Area Air Quality Management District found that the City's Environmental Impact Report may significantly underestimate cancer risk, PM<sub>2.5</sub> concentrations, and many others because "the modeling underestimated the exposure duration [and] used inconsistent breathing rates" (Hiklen, 2019). This project analyzes air pollution levels, demographics, and mitigation perceptions held by the OSD community. This research helps build local knowledge and resilience to the Charcot Extension Project, air pollution, and environmental injustice.



Figure 1B: Charcot Extension (yellow) (EIR, 2019, p. 7)

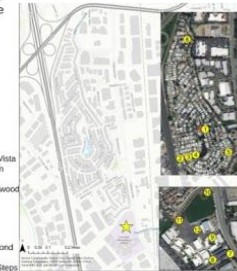


Figure 2: Air Pollution Data Collection Sites at Orchard School District and Casa de Lago.

## RESEARCH QUESTIONS

1. What are current levels of air pollution at Orchard School and in the surrounding neighborhood?
2. What are local perceptions of air quality and the Charcot Extension Project?
3. How can Orchard school, local community members, and community based partners continue to build a space for community knowledge on, participation in, and resilience to the Charcot Extension Project, air pollution, and environmental injustice?

## ACKNOWLEDGMENTS

Many thanks to Judianne Ganschow & Robin Roemer with Orchard School District, Vanessa Talania with Breathe California, our Orchard student volunteers, Dr. Christopher Bacon, and the Santa Clara University Environmental Studies & Sciences Department.

## METHODS

### Community-Based Participatory Action Research

Participatory	Action
<ul style="list-style-type: none"> <li>Collaborated with OSD community members throughout the project and will present our findings at a school meeting.</li> <li>Six OSD student volunteers aided in choosing locations and data collection.</li> <li>Breathe California staff and interns aided in data collection.</li> </ul>	<ul style="list-style-type: none"> <li>Providing resources for OSD and the local community on current air quality, traffic density, perceptions on air pollution in the locally, the Charcot Extension, and health impacts, and possible mitigation strategies.</li> <li>Allows for further action that is community driven, evidence-based, and multi-sectional.</li> </ul>

**Research- Mixed Methods**

- Air Pollution** - CPC 3007 devices used to measure ultraviolet particulate matter (particles/cm<sup>3</sup>). Data collected at six sites in Orchard School District and six sites in the Casa de Lago Mobile Home Park (Figure 2). Data was collected for ten minutes at each site, five times a week (two morning, two afternoon, and one evening), for three weeks.
- Traffic Counts** - Vehicles passing each OSD and Casa de Lago site recorded during the same air pollution time interval. Recorded in only one direction.
- Survey** - 25-question survey distributed virally to parents of schoolchildren, OSD faculty, and other community members. Questions included perceptions of air pollution, health impacts and personal experiences regarding air pollution, opinions of present and traffic density, and demographic details.

## FINDINGS - Air Pollution

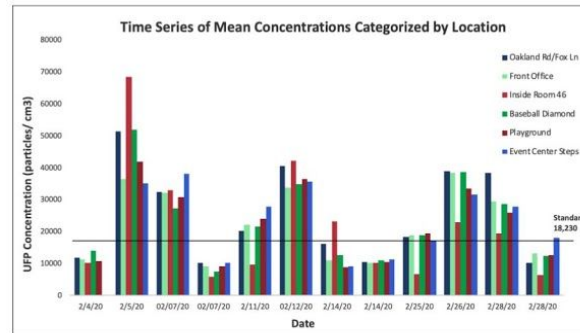


Figure 3: Pollution Averages by Date and Location

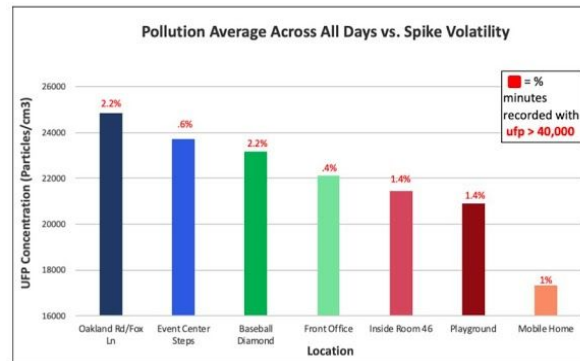


Figure 4: Pollution Total Averages by Location vs. Spike Count

## FINDINGS, CONTINUED - Surveys

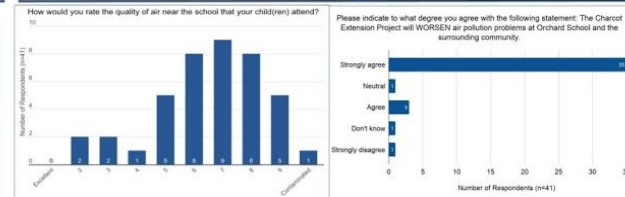


Figure 5: Air Quality Perception

Figure 6: Charcot Extension Perception

"This project will bring unnecessary traffic that is not part of our community right through our close knit neighborhood taking some of the school property which affects our students and creates a dangerous environment. This project is very much outdated, and should not be considered any longer." -OSD Community Member

"Since students will be affected during recess and P.E., the best way to mitigate the effects is to stop them from happening. The project needs an alternate route further away from the school." -OSD Community Member

## DISCUSSION & MITIGATION

### Air pollution findings

- Measurements of UFP concentrations above the threshold derived from a study showing that average concentrations of 18,230 #/cc or above impact children's asthma rates at school (Heinzerling et al., 2016).
- Average concentrations per sampling locations at Orchard School exceeded 20,000 #/cc.
- Some locations with lower averages still experienced higher volatility in spikes that exceeded 40,000 #/cc.
- Mobile Home Park averaged lowest UFP levels compared to all locations studied.

### Survey results

- Fear's regarding air pollution's effects on children's health, specifically cognitive development, respiratory ailments, and academic performance.
- Residents believe the project would make air pollution and traffic-pedestrian issues worse.

### Mitigation Strategies

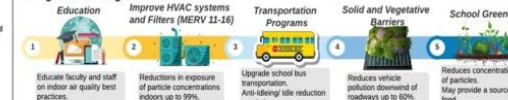


Figure 7: Strategies Orchard Elementary could implement to reduce existing air pollution & additional pollution if the Charcot Extension passes. While more exist, these have been considered by community members, the researchers, and an EPA guide as pertinent (EPA, 2015).

## CONCLUSION

- Current levels of air pollution (e.g., UFPs) at Orchard School exceed the threshold associated with known health impacts in children.
- Although Mobile Home Park was expected to have highest location average, our study found that the intersection of Oak Rd/Fox Ln has the highest averages and highest exposure to spikes.
- Community members of Orchard School have negative perceptions on air pollution, and are aware of health issues that this can bring.
- Community members are aware of the Charcot Extension Project, understand its goals and plans, and are adamantly against its construction.
- The community of Orchard School will continue to facilitate a space with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project.
- We recommend that Orchard School begins to further research and integrate mitigation strategies now to better the current air quality.

## REFERENCES

City of San Jose. (2019). Charcot Avenue Extension Project. Retrieved from: <https://www.sanjoseca.gov/your-government/departments/planning-building-code-enforcement/planning-division/normal-planning/environmental-review/active-air/charcot-avenue-extension-project>

EPA. (2015). Best practices for reducing near-road pollution exposure at schools. Retrieved from: [https://www.epa.gov/sites/default/files/2015-10/documents/ochp\\_2015\\_near\\_road\\_pollution\\_booklet\\_v16\\_508.pdf](https://www.epa.gov/sites/default/files/2015-10/documents/ochp_2015_near_road_pollution_booklet_v16_508.pdf)

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Pastor, M., Morello-Frosch, R., & Sadek, J. L. (2006). *Breathless: Schools, air toxics, and environmental justice in California*. *Policy Studies Journal*, 34(3), 337-362.



## Air Pollution in the Orchard School District & The Charcot Extension Project: A Response



**BREATHE**  
**CALIFORNIA**  
*of the Bay Area*

**Orchard School District**

Katherine Angell, Olivia Fitzpatrick,  
Cory Gong, & Juliette Levy

### Our project....

1. Analyzes air pollution levels, demographics, and mitigation perceptions held by the OSD community
2. Help build local knowledge and resilience to the Charcot Extension Project, air pollution, and environmental injustice.



## Research Questions

1. What are current levels of air pollution at Orchard School and in the surrounding neighborhood?
2. What are local perceptions of air quality and the Charcot Extension Project?
3. How can Orchard school, local community members, and community based partners continue to build a space for community knowledge on, participation in, and resilience to the Charcot Extension Project, air pollution, and environmental injustice?



Photo by Tess Rosenberg

## Methods

### Community-Based Participatory Action Research

#### Participatory

- Collaborated with **OSD community members** throughout the project and will present our findings at a school meeting.
- Six **OSD student volunteers** aided in choosing locations and data collection.
- **Breathe California** staff and interns aided in data collection.

#### Action

- Providing **resources** for OSD and the local community on current air quality, traffic density, perceptions on air pollution in the locality, the Charcot Extension, and health impacts, and possible mitigation strategies.
- Allows for **further action** that is community driven, evidence-based, and multi-sectional.

#### Research- Mixed Methods

- **Air Pollution** - CPC 3007 devices used to measure ultrafine particulate matter (particles/cm<sup>3</sup>). Data collected at six sites in Orchard School District and six sites in the Casa de Lago Mobile Home Park (Figure 2). Data was collected for ten minutes at each site, five times a week (two morning, two afternoon, and one evening), for three weeks.
- **Traffic Counts** - Vehicles passing each OSD and Casa de Lago site recorded during the same air pollution time interval. Recorded in only one direction.
- **Survey** - 25-question survey distributed virally to parents of schoolchildren, OSD faculty, and other community members. Questions included perceptions of air pollution, health impacts and personal experiences regarding air pollution, opinions of present and traffic density, and demographic details.

## Air Pollution

- CPC 3007 Devices, measuring Ultrafine Particulate matter (UFP)
- OSD, 6 sites
  - 4x's a week, 10 minutes at each site, over 3 weeks
- Casa de Lago, 6 sites
  - 1x a week, 10 minutes at each site, over 3 weeks

- Casa de Lago**
1. Main Office
  2. Laguna/Arroyo
  3. Laguna/Buena Vista
  4. Laguna/Fountain
  5. Arroyo
  6. Creekside/Westwood
- Orchard School**
7. Oakland/Fox
  8. Front Office
  9. Inside Rm 46
  10. Baseball Diamond
  11. Playground
  12. Event Center Steps



## Traffic Counts

- Traffic counted flowing in one direction
- Same locations
- Recorded during same air pollution measurement interval
- OSD
  - OSD students
- Casa de Lago
  - SCU students

### Air Pollution & Traffic Count Tally Sheet

Student Name(s): \_\_\_\_\_  
 Location: \_\_\_\_\_ Coordinates: \_\_\_\_\_  
 Time Start: \_\_\_\_\_ Time End: \_\_\_\_\_  
 Elevation: \_\_\_\_\_ Direction From: \_\_\_\_\_ Direction To: \_\_\_\_\_  
 Weather Conditions: \_\_\_\_\_ Wind Direction: \_\_\_\_\_  
 Meter Number: \_\_\_\_\_  
 Air Pollution  
 Concentration minimum: \_\_\_\_\_ Concentration maximum: \_\_\_\_\_  
 Concentration mean/average: \_\_\_\_\_  
 Notes: \_\_\_\_\_

### Traffic Count Tally

Heavy Truck (semi)		
Medium Truck (box)		
Small Truck (personal)		
Bus		
Car/Van/Taxi		
Plane		
Other: please specify		

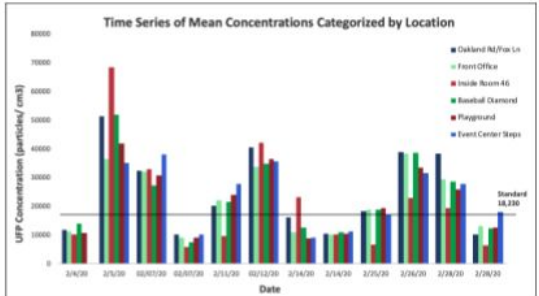
# Surveys

25 question online survey administered to any interested OSD community members

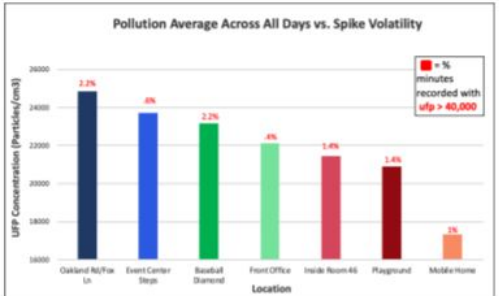
Two example questions:

- Regarding air pollution
  - How would you rate the **quality of air** near the **school** that your child(ren) attend?
  
- Regarding Mitigation Strategies
  - What mitigation strategies do you think would provide the students the most protection from the Charcot Extension Project?
    - a. Pedestrian bridge
    - b. Heating, ventilation, and air conditioning replacement within the classrooms
    - c. Adding double paned windows
    - d. Distributing face masks
    - e. Other: \_\_\_\_\_
    - f. I don't know

# Findings: Air Pollution



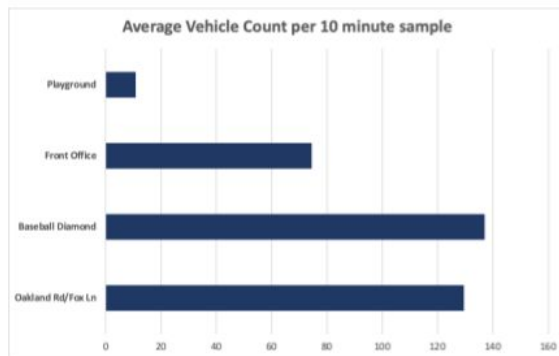
Air Pollution Averages by Date and Location



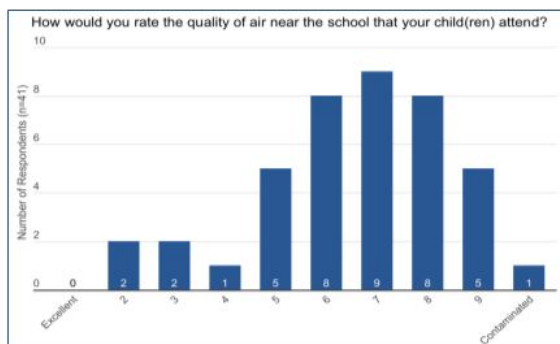
Pollution Total Averages by Location vs. Spike Count

## Findings: Traffic Counts

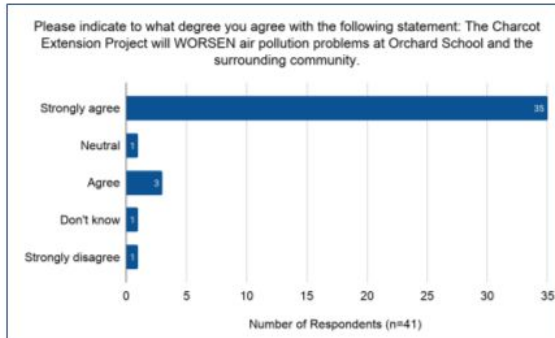
- OSD
  - Baseball Diamond Average = 137; High = 168
  - Playground Average = 10; High = 33
  - Oakland x Fox Average = 129; High = 173
  - Front Office Average = 74; High = 139
- Casa de Lago
  - Main Office Average = 50; High = 55
  - Other locations, total cars per location = <10



## Findings: Surveys



Air Quality Perception



Charcot Extension Project Perception



## Findings: Survey Quotes

"This project will bring unnecessary traffic that is not part of our community right through our close knit neighborhood taking some of the school property which affects our students and creates a dangerous environment. This project is very much outdated, and should not be considered any longer."

-OSD Community Member

"Since students will be affected during recess and P.E., the best way to mitigate the effects is to stop them from happening. The project needs an alternate route further away from the school."

-OSD Community Member

## What does this mean?

### Air pollution findings

- Average UFP concentrations at or above the threshold of 18,230 #/cc impact children's asthma rates at school (Heinzerling et al., 2016).
- OSD
  - Average concentrations per sampling location = 20,000+ #/cc
- Some locations with lower averages still experienced higher volatility in spikes that exceeded 40,000 #/cc.
- Mobile Home Park averaged lowest UFP levels compared to all locations studied.



Photo by Tess Rosenberg

## What does this mean?

### Traffic Counts

- Little research on UFPs from vehicles traveling near schools
  - Traffic around Orchard already alarmingly high during 10 minute intervals
  - Concentrations of air pollutants (PM2.5) in and outside schools near major traffic channels affected by distance, traffic density and composition, and wind direction
    - PM2.5 & NO2 (nitrogen dioxide) significantly increased with increasing traffic, but decreased with distance and variable wind (Janssen et al., 2001)
- Due to little research, it's also difficult to attribute UFP emissions per vehicle
- Regardless, increasing traffic flow will increase PM2.5, NO2, and UFP emissions

## What does this mean? (cont.)

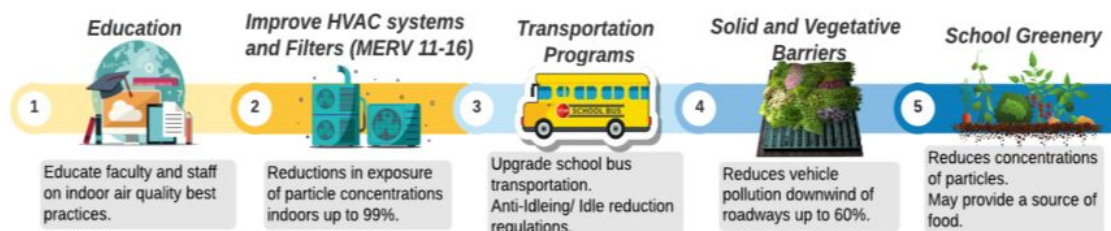
### Survey results

- Fears regarding air pollution's effects on children's health, specifically cognitive development respiratory ailments, and academic performance.
- Residents believe the project would make air pollution and traffic-pedestrian issues worse.



Photo by  
Tess Rosenberg

## Mitigation Strategies



These are strategies schools can implement to reduce existing air pollution & additional pollution if the Charcot Extension passes. While more exist, these have been considered by community members, the researchers, and an EPA guide as pertinent.

\*More strategies and resources for this are available on our final report.

## Conclusion

- Current levels of air pollution (UFPs) at Orchard School **exceed the threshold** associated with known health impacts in children
- Although Mobile Home Park was expected to have highest location average, our study found that the intersection of Oak Rd/Fox Ln has the **highest averages** and **highest exposure** to spikes.
- Community members of Orchard School have **negative perceptions** on air pollution, and are aware of **health issues** that this can bring.
- Community members are aware of the Charcot Extension Project, understand its goals and plans, and are **adamantly against** its construction.



Photo by Tess Rosenberg

## Conclusion

- The community of Orchard School will continue to **facilitate a space** with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project.
- We recommend that Orchard School begins to further research and integrate **mitigation strategies** now to better the current air quality.



Photo by Tess Rosenberg

## Thank you!

We would like to thank:

- Judianne Ganschow & Robin Roemer with Orchard School District
- Vanessa Talania with Breathe California
- Our Orchard School District student volunteers
- Tess Rosenberg, SCU Student
- Dr. Christopher Bacon
- Santa Clara University Department of Environmental Studies & Sciences

# Air Pollution in the Orchard School District & The Charcot Extension Project: A Response



**Orchard School District**



**BREATHE**  
**CALIFORNIA**  
*of the Bay Area*

Santa Clara University in Partnership with Orchard School District & Breathe  
California of the Bay Area  
Environmental Science and Studies Department  
Katherine Angell, Olivia Fitzpatrick, Cory Gong, & Juliette Levy  
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## **Executive Summary**

Air pollution has a tangible and undeniable affect on human health, specifically on the lung growth of children and the unfortunate development of respiratory issues such as asthma. Oftentimes, such pollution is caused by traffic density and a lack of mitigation strategies to combat the resulting issues. In an effort to further understand such impacts on children's health, this project measured air pollution levels around the Orchard School District and analyzed the results. We ultimately found that the air pollution levels around the Orchard School are higher than the average to which we compared the measurements, and that current levels of air pollution (UFPs) at Orchard School exceed the threshold associated with known health impacts in children. Furthermore, the City of San Jose plans to implement the Charcot Extension Project, which would extend Charcot Avenue and cut right through part of the Orchard School property. The project would increase traffic density in the area and potentially further inhibit the healthy lung growth of the students at the school. In order to further understand the community's perceptions on this project plan, we conducted a 25 question online survey, of which the community members' participation was completely voluntary. Overall, we found that community members of Orchard School have negative perceptions on air pollution, and are aware of health issues that it can bring. In addition, we also found that community members are aware of the Charcot Extension Project, understand its goals and plans, and are still adamantly against its construction. In conclusion, we recommend that the community of Orchard School continue to facilitate a space with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project. We also recommend that Orchard School begins to further research and integrate mitigation strategies now to better the current air quality.

## **Section 1: Introduction**

In recent years, there has been a growing scholarly discourse on the intersection of air pollution at and around schools, demographics of students, and health impacts of traffic related pollutants (Gaffron & Neimeier, 2015; Green, Smorodinsky, Kim, Mclaughlin, & Ostro, 2004; Mohai, Kweon, Lee, & Ard, 2011; Morello-Frosch et al., 2002; Pastor, Morello-Frosch, & Sadd, 2006). School location has been found to be a major determinant of exposure to traffic related air pollutants because children spend a substantial amount of their time at school campuses (Green et al., 2004). Not only this, but the location of schools near heavy traffic roads can have detrimental impacts on the health of students attending those schools, and those students who are attending schools with high exposures to outdoor air pollution are disproportionately from low-income and racial or ethnic minority communities (Gaffron & Neimeier, 2015; Pastor et al., 2006). This intersectional issue is one of major importance for the future of our world's schools and children, especially those who are most disadvantaged.

Orchard Elementary School, a public school in San Jose consisting of roughly 900 elementary and middle school students, is one of the oldest school districts in the state of California, having been established in 1862. This school is currently facing issues of environmental justice, which the EPA defines as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (US EPA 2009). Additional research proposes that the ‘justice’ part of environmental justice contains three elements: (1) distributive equity of environmental risk; (2) the recognition of environmental participants’ diversity and experiences; and (3) participation in any and all political processes to create and manage environmental policy wherever found (Scholsberg, 2007). In other words, environmental justice calls for not only distributive justice among environmental costs, benefits, and policies, but for equal involvement for all participants in the procedures that create environmental costs and benefits.

The school and the surrounding district are facing a critical environmental justice issue with the City of San Jose’s plan to implement the Charcot Extension Project, adding a freeway that cuts through the school’s campus and would bring 40,000 cars directly adjacent to the playground. A total of 892 students in K-8, 94% minority students, will be put at risk to the health impacts of increased air pollution. Therefore, this project aims to analyze air pollution and demographics at and around Orchard School and understand community attitudes and thoughts on mitigation strategies to be able to build Orchard community’s local knowledge and resilience to further propagation of the Charcot Extension Project.

The Bay Area is considered one of the most polluted metropolitan regions by average year-round concentration of particulate matter (PM2.5). Orchard Elementary is already situated between Freeway 880 and Oakland Rd, a 7-lane wide arterial highway, therefore we hypothesize that our data collection will show that the community is already experiencing negative effects from air pollution. In fact, data from CalEnviroScreen shows that the census tract Orchard Elementary is located in is populated by 82% people of color and is in the 95th percentile for pollution burden.

The Charcot Extension Project is emblematic of a larger, more serious national injustice that needs to be addressed, not just in our backyard of northern San Jose, but in our country as a whole. This project is symbolic of the fact that air pollution in schools is a problem that has



impacted children in every single state in our country, particularly in our own state of California. While this is in fact a national level problem, we as a research team are narrowing down to focus on a local example where this problem can be seen. Furthermore, the Charcot Extension Project is just one way the intersection of environmental issues and social justice issues presents itself in our country. It is undeniable that those who bear the greatest brunt of environmental issues are those who have contributed to the problem the least. These are often communities of color with lower income levels and fewer access to resources. Orchard School and the Charcott extension project serve as an emblem of this much larger national issue.

It is crucial to monitor and track areas where air quality is worst, especially areas where children spend a majority of their time. Our study will work to address this by collecting air pollution data using two CPC 3007s, air pollution measuring devices, for three weeks at peak times when school children are the most exposed to air. Peak times studied will include morning drop-off and afternoon pick-up, although future studies should include recess and lunchtime for more robust data. One study in Southern California analyzed air pollution and lung function in fourth graders. As described by Gauderman, et al., (1999) children in fourth grade living in the most polluted areas of Southern California experienced significant deficits in their lung function growth as a result. Such deficits were generally greater for children who spent more time outdoors. The study they performed indicated that where there are high concentrations of pollutant particles, there are significant negative effects of lung function growth in children. Breathing polluted air brings health complications such as increased cardiorespiratory morbidity/mortality, as well as respiratory issues and decrements in overall lung function. These health concerns are particularly prevalent in children, due to the amount of time they spend playing outdoors, their higher ventilation rates than adults, and partially due to the size and state of development of their lungs (Gauderman, et al., 1999). In another study published in Environment Health Perspective, children in Southern California living in areas with high levels of ozone and particulate pollution matter were more likely to develop asthma. Furthermore, children with asthma that live in these areas with high levels of pollution were far more likely to experience symptoms of asthma much more powerfully than children with asthma that lived in areas with low levels of pollution (Wilhelm, et al., 2008).

The school and neighboring community is incredibly concerned about the additional potential burden the Charcot Extension would bring. Interviews and surveys will be administered to parents, teachers, and other community members to collect a detailed description of attitudes regarding current traffic density levels and the extension plan. It is important to bring forward the community's perspective because of the environmental justice nature of this project. Data acquired from surveys and interviews will be used to discuss future plans for Orchard Elementary in fighting this environmental justice issue. We hope that the implementation of our project will empower the whole community to get involved and take action. This will be helpful to assess how the school can create a space for future leadership and participation and the community's next collaborative steps to stop the Charcot Extension.

## **Section 2: Literature Review**

### *Part I: Environmental Justice*

Since its creation in the 1980's, the term environmental justice has been used to describe the fair treatment and significant involvement of all persons, regardless of any personal characteristic or demographic, in respect to the creation, execution, and enforcement of environmental laws, policies, and developments in order to promote a clean and healthy environment. There are numerous cases in the Bay Area, United States, and around the world that demonstrate the disproportionate burden of environmental negatives on minority populations and the struggle of those facing these burdens to build a world in which they are treated equitably and respectfully by those in positions of power. A substantial and increasing volume of reports, articles, and movements establish that environmental burdens are disproportionately placed on low-income, less educated, racial or ethnic minority, ESL (english as a second language), and indigenous communities. However, not as much research has been done on the effects of environmental injustice on children, especially as it relates to school location, programs, funds, and other school characteristics. Children have little to no choice on where they live and go to school, often unaware of environmental burdens they may be exposed to daily and the impacts that those burdens may have on their health and academic performance.

While the state of California has been a leader in the effort for reducing air pollution that has negative consequences on the health of humans and the environment, there are numerous communities that are exposed to such high rates of air pollution that it threatens public health. These communities are overwhelmingly low-income and minority, leaving the most vulnerable in these already disadvantaged communities at most risk (Gaffron & Neimeier, 2015). In 2006, Pastor and colleagues conducted a study that found that low-income and nonwhite California students were exposed to higher levels of respiratory disease from traffic-related air pollution, and that this exposure was related to lower performance on standardized tests and increased school day absences (Pastor et al., 2006). A more recent study found that higher rates of traffic related PM2.5 emissions at and around schools are “significantly positively correlated with the following metrics: percent share of Black, Hispanic, and multi-ethnic students and percent share of students eligible for subsidized meals,” and correlated “negatively with the schools’ Academic Performance Index, the share of White students, and average parental education levels” (Gaffron & Neimeier, 2015, pp. 2009). Additionally, the presence of heavily trafficked roads and California public schools with high rates of non-white, English learning, and low-income students are inherently linked (Green et al., 2004; Gunier et al., 2003).

Our case at Orchard school focuses on the proposal and future implementation of the Charcot Extension project. The school is 94 percent students of color, 46 percent of its students qualify for free or reduced lunch, and it's diversity score is at .64 while the whole State of California's score is .41 (Public School Review, 2020). Many students are of minority race and/or are of low-income status, leaving them more vulnerable than their white, affluent counterparts to environmental burdens. Orchard is already burdened by its general location in San Jose because of the existing high rates of air pollution and its close location to multiple major roadways. The Environmental Impact Report done on the extension determined that this project would not have any significant or unavoidable impacts to air pollution, but this study was done with modeling that members of Orchard PTA deem inadequate (City of San Jose, 2019).

Even though members of the community have voiced extreme concerns at meetings on the extension and to city council and have demonstrated that the project is in direct contradiction to San Jose's Climate Smart and Vision Zero development goals, the city still currently plans to execute the extension. The question then is why would the government approve a plan that would put hundreds of children and thousands of other community members at risk of traffic-related air pollution health impacts and potentially increased traffic-related accidents?

### *Part II: Traffic-Related Air Pollution*

As the world becomes more populated and cities become more dense, more people are living closer to major roadways, and thus are exposed to higher accident incidents and higher rates of pollutants being carried in the air. Traffic from motorized vehicles (e.g. motorcycles, cars, trucks, and planes) is one of the most significant contributors to ambient air pollution, especially in California. So much so that it has various detrimental impacts on public health and the environment. These fuel burning vehicles and other generators, such as waste incinerators, produce minute airborne particles such as PM10, the largest of the three, PM2.5, the middle, and ultrafine air pollution particles (UFPs) that are around 0.1 micron in diameter or about one-thousandth the width of a human hair. Since the Clean Air Act was first enacted, thousands of studies have been done, showing that the tiniest of PM particles are the most dangerous (US EPA 2009). Because UFPs are so microscopic, humans have inadequate natural defenses so they can enter the respiratory system and bloodstream and harm vital organs, including the brain (Polidori et al., 2012).

UFPs are not currently measured or regulated by the United States Environmental Protection Agency, thus not requiring air districts to monitor these tiny particles. Even though UFPs are important components of PM2.5 and PM10, the effects of UFPs are just beginning to be documented as more toxic than larger particular matter, especially for particularly vulnerable populations including children (Heinzerling et al., 2015). The US EPA has acknowledged that further monitoring of UFPs is required to even consider independent regulation for this particle size fraction (US EPA, 2010). Around the United States, pilot programs are being introduced to address these requirements of the US EPA; New York, Los Angeles and the Bay Area are some of the cities that local and federal agencies are stationed to measure UFPs (BAAQMD, 2015). In the Bay Area, the Bay Area Air Quality Management District (BAAQMD) has been studying UFPs since 2010, and have created multiple reports documenting areas, sources, amounts, and health impacts of UFPs (2010; 2014; 2015). Their reports estimate that UFPs contribute to more than 800 premature deaths a year in the areas, and total the value of the losses related to UFP exposure to over \$7 billion. Of all counties, Santa Clara County (SCC) experiences the second largest impacts after Alameda, which is in contrast to the overwhelming impacts of PM2.5 on SCC. This shows that UFPs are a localized issue and require regional mitigation strategies.

PM2.5 is responsible for around 95 percent of global public health impacts from air pollution and the vast majority of the global 3 to 4 million annual deaths attributed to air pollution (UCS, 2019). It is of exceptional concern in California because it encompasses seven of the ten most polluted US cities in terms of PM2.5 pollution, with the Bay Area being in the nations top 10 polluted areas based on short term and year long particle pollution (ALA, 2018). Orchard School is located in a census tract that is exposed to traffic related pollutants (88%) such as diesel particulates (92%) and PM2.5 (53%) (OEHHA, 2017). Since Orchard is located next to

a busy freeway and main expressway that exposes the school to emissions from thousands of vehicles a day, traffic related air pollution is of main importance to reduce as much as possible because of the documented negative health impacts on children. While there are other pollutants that are of concern in the area such as ozone, solid and hazardous waste, and groundwater threats, ambient air particulates represent high levels of the overall pollution burden in the census tract, the Bay Area, and even California in general (OEHHA, 2017). Because of the high levels of present air pollution in the Bay Area and the serious health consequences, those who are most vulnerable such as children, the elderly, and those sensitive populations who already have adverse health effects, such as asthma, must be carefully considered in issues regarding air pollution.

### *Part III: Health Impacts*

The health and safety of children in schools has become a major topic in recent years, and has spurred the development of programs and policies in order to protect children from various environmental exposures that can detrimentally impede their ability to learn and interact with their peers successfully (CHEJ, 2001). Parents and students expect that schools, where children spend hours a day, are safe spaces, but that is not the case as thousands of public schools in the US are situated within 500 feet of major roadways with significant traffic (Hopkins, 2017). A majority of people take in small amounts of toxic mixes of air pollution on a regular basis, but those who live, work and go to school next to heavily trafficked roads often get larger and more consistent amounts. More is obviously worse for health, especially for children.

Studies show that children's lungs are not as fully developed as adults', leaving them vulnerable to ambient air pollution during crucial periods of physical and psychological development which can lead to lifelong negative health impacts (McConnell et al., 2010; Ostro et al. 2006; Pastor et al., 2006; Mohai et al., 2011; Wilhelm et al., 2008; Wjst et al., 1993). The Committee of the Environmental and Occupational Health Assembly of the American Thoracic Society reported that exposure to high levels of PM<sub>10</sub> and smaller particles, often produced by petroleum using traffic, are related to hospital admissions in children due to respiratory issues, school absences, decreases in lung air flow rates, and increased use of asthma medication (1996). Similarly, children exposed to PM<sub>10</sub> have the lowest scores on neurological tests such as reduced performance on verbal and nonverbal intelligence and memory tests (Suglia et al., 2008). Further evidence from The Children's Health Study shows that exposure to regional air and traffic-related pollutants are related to increased asthma prevalence, bronchitis risk, decreased lung function, and airway inflammation (Chen et al., 2015). While studies are able to show relations between these health impacts, there is not yet enough exposure data to establish the full health impacts because there is so little ultrafine monitoring.

Children's lungs can take in 20 to 50 percent more air and, thus, more dangerous air particles than adults' (Kleinman, 2000). On top of that, children spend more time outside, often exercising, which only increases the amount of air and possible pollutants being inhaled. While children's bodies are still growing and changing, ambient pollutants can damage the development of respiratory function, as well as cognitive function crucial to academic performance (Calderón-Garcidueñas et al., 2007). Schools located in areas with the highest levels of air pollution have the lowest attendance rates, which is a potential indicator of poor health, and the highest proportions of students who failed to meet state educational testing

standards (Mohai et al., 2011). Because children spend half of their childhood in school and are often unable to individually choose where they go to school, it is incredibly important to recognize and minimize exposure to environmental negatives at and around schools. The health impacts of air pollution on children are generally troubling, but what is also troubling is that these pollutants are particularly bad for asthmatics, and not only do low-income and minority children have higher rates of asthma, but they are more likely to attend schools near heavily trafficked areas. The next question to be answered from this knowledge is: what can be done by scholars, governments, impacted communities, and others to remediate disproportionate environmental burdens so that negative health impacts are mitigated?

#### *Part IV: Mitigation Measures*

In 2003, the state of California passed Senate Bill 352 Schoolsites: Sources of Pollution which banned the construction of new schools on land within 500 feet of the closest traffic lane of a freeway or other busy traffic corridor (Polidori et al., 2012). However, there is no current legislation regarding the assessment of existing schools, or infrastructure changes surrounding existing schools. Moreover, while research on air pollution in schools is expanding, many parent and school groups are largely unaware of the problem (Hopkins, 2017). Therefore, many districts have no incentive for efforts to mitigate air pollution inside schools already impacted by substantial traffic, even though studies at schools in California show that high quality air filters that the EPA recommends make a significant difference. Within the last 10 years, air purification systems have been piloted in schools around the country to reduce air contaminant exposure. The coupling of a register system and a high performance panel filter have been found to reduce close to 90 percent of pollutants such as PM<sub>2.5</sub> (Polidori et al., 2012). The technology has begun to be established better, with the installation and management being fairly simple, but costs range largely based on the present HVAC system and ventilation. Hearing studies' and the EPA's advice, the South Coast Air Quality Management District has identified funds to cover the cost of filters at 80 schools near freeways (Hopkins, 2017).

In 2015, the EPA released a guide for reducing road pollution at schools that include reducing indoor air pollution through systems such as the filters and site-related strategies for reducing near-road pollution exposure. Of the latter methods, it includes transportation policies such as idle reduction policies and encouraging active transportation (bike riding and walking) and roadside barriers such as sound walls and vegetation (EPA, 2015). There are measures that Orchard school, and many other schools, could be implementing now to reduce existing air pollution and could reduce additional pollution if the Charcot Extension moves forward (See Table 1.) While these guidelines are a start in addressing ways in which schools and local governments can mitigate air pollution in schools, there are also movements in schools nationally and even internationally that are fighting for firm action from governments in the protection of air quality for children in schools.

Table 1: Potential air pollution mitigation strategies and possible benefits and disadvantages.

Potential Air Pollution Mitigation Strategies	Benefits	Disadvantages
Educate faculty and staff on ventilation and indoor air quality best practices	Teachers are trained to be knowledgeable on ways in which they can help to reduce indoor air pollution. This can transfer to students who may employ similar techniques at home such as making sure air vents remain unobstructed, doors/windows are kept closed during peak pollution periods, and indoor sources of air pollution are reduced.	Results wholly depend on the quality of training and cooperation on part of the staff. Productiveness may decrease over time. This is only reducing the amount of air pollution allowed indoors, not really decreasing air pollution in general.
Double pane windows and air seals	May reduce the amount of unfiltered air entering the classroom and other buildings. May significantly reduce outdoor noise pollution. Energy-efficient window design often allows for smaller and less costly HVAC systems, thus freeing funds that can be allocated to the efficient window technologies (Efficient Windows Collaborative, 2011).	If ventilation is poor, <b>indoor pollutant concentrations may build over time</b> indoors. This is only reducing the amount of air pollution allowed indoors, not really decreasing air pollution in general. The <b>cost</b> will vary based on the model and insulation, but is expected to pay anywhere between \$450 and \$600 per <b>double-paned window</b> on a new installation (Efficient Windows Collaborative, 2011).
Filters	Reduces particles from outdoor and indoor sources. MERV 11 air filter effectively removes 15 (0.3 $\mu$ m) -58 (1.0 $\mu$ m)% , MERV 13 removes 30-85%, and MERV 16 removes 90-99% (Polidori, 2012). Anything above a 13 MERV rating is considered to be a High-Efficiency Particulate Arrestance (HEPA) filter, often used for hospitals and scientific research lab applications.	Maintenance, upgrades, and replacement required. They may be costly. The total annual costs of these are: 11: \$102 to 130; 13: \$150 to 210; 16: \$370 (Polidori, 2012). This only addresses indoor air pollution.
Improve HVAC system design and add Filters	Larger reductions in particle concentrations are possible. When using a HVAC-based high-performance panel filter, reductions of indoor concentrations of Black Carbon, UFP, and PM2.5 were close to 90% (Polidori, 2012).	This may be costly. Magruder Elementary (K-8) in York County serves almost 600 students. They spent \$3,250,000 in 2015 to replace all HVAC equipment & controls (The York County School Division, 2016). This only addresses indoor air pollution.
Implement anti-idling/idle reduction policies	Reduces emissions of particles. Personal-vehicle idling generates around 30 million tons of CO2 annually in the U.S. Following an anti-idling campaign introduced at four schools, the average difference in PM2.5 at the school with the most buses decreased from 4.11 $\mu$ g m <sup>-3</sup> to 0.99 $\mu$ g m <sup>-3</sup> ( $p < 0.05$ ) (Ryan et al., 2013). Schools may post anti-idling signs or work with the school board on a district wide campaign.	Lack of vehicle climate control. May be difficult and timely to enforce.
Upgrade school bus transportation	Reduces emissions of particles. Students may be and feel safer from traffic-pedestrian accidents which can have an impact on a student's attendance and their overall academic performance. This can have an effect on the quality of a student's education, enable students to attend higher-quality schools that might have been previously inaccessible, and allow for participation in enriching before- and	This may be costly. The average cost of transportation per student is already \$914 per year. Introducing more busses would obviously cost the amount of buying more busses and resources needed to run these busses. An electric school bus is about \$120,000 more expensive than a diesel version (Descant, 2018).

	<p>after-school activities (Urban Institute Student Transportation Working Group, 2017). Diesel retrofit technologies can be added to existing diesel school buses in order to reduce emissions, including installing devices in buses' exhaust systems and upgrading certain engine components. This can be more cost-effective than other interventions. Electric school buses, which have only been commercially available since 2015, are zero-emission vehicles. As a result, electric options are by far the most environmentally friendly school buses. They also are the cheapest fuel option and require the least maintenance. Estimates from the public bus sector indicate that lifetime costs of a diesel bus are \$1.4 million, versus an electric's \$1 million (Holder, 2018).</p>	<p>More effective routing is specific to school sites. A group of MIT researchers created an algorithm for Boston Unified School District that eliminated 50 bus routes at the start of the 2017-2018 school year, saving the district roughly \$5 million upfront (McGinty, 2017).</p>
Encourage active transportation (e.g. walking & biking) to school	<p>Reduces emissions of particles. May improve health with exercise.</p>	<p>Walkers and bicyclists may be exposed to traffic-related pollution or other hazards during trips.</p>
Design school site to minimize exposure to pollutant sources	<p>Reduces exposure to particles and gases.</p>	<p>Effectiveness is specific to the school site. This may be difficult and costly for existing schools.</p>
Use solid and vegetative barriers	<p>Reduces concentrations of particles. Reduces vehicle pollution downwind of roadways up to 60% (EPA, 2015). Vegetative barriers may increase shade and improve aesthetics.</p>	<p>This may be costly. Best design may be specific to the school site.-- At Orchard School, this may create an unsafe alley if along Silk Wood Ln. Maintenance and water needs for vegetative barriers.</p>
General greenery	<p>Reduces concentrations of particles. Greenery may increase shade, improve aesthetics, and provide a source of food (if a producing garden) for students, which can aid food insecure children and their families.</p>	<p>This may be costly. Best design may be specific to the school site. Maintenance, collection, and water needs.</p>

El Marino Language School in Culver City, Los Angeles is situated next to the 405 freeway, which is known as one of the largest and busiest freeways in the US at 13 lanes and with as many as 375,000 vehicles daily, and ocean winds blow traffic-related pollutants towards the school. Parents and teachers joined forces and realized the impacts that air pollution could have on the children going to school there. They borrowed a university's ultrafine particle counters, attended board meetings, and campaigned for a bond measure to raise funds for a filtration and air-conditioning system. It took more than two years for the filters and AC system to be retrofitted and it cost \$2.5 million. While this does not help the quality of air that the children are playing and eating outside in, air quality in classrooms has improved (Hopkins, 2017). This shows that there are options for Orchard school to improve the current quality of air and that strong coalition movements have the power to create positive change. If the Charcot Extension is passed, there are mitigation strategies such as a pedestrian bridge to reduce the risk of traffic incidents, HVAC replacement, and sound walls that can be developed with time, money, and help from the city and state government.



As further articles and movements surrounding air quality, environmental justice and health in schools are being created around the world, this project aims to act as a case study for further exploration on this issue broadly and as a local issue to support the voices of those most affected. In this paper, we will document the base levels of air pollutants at and around Orchard School, understand levels of air pollution in relation to the area's demographics, gather local community perceptions on air quality and the Charcot Extension Project, and recommend ways in which those involved can build spaces for community knowledge and participation in issues of environmental justice.

### **Section 3: Research Questions**

Our first research question focuses on collecting and analyzing quantitative data to assess the current state of air pollution risk at the school. We will be using CPC 3007s to collect data at peak hours of child exposure for 3-4 weeks at critical campus locations. From this, we hope to build baseline data to more accurately assess potential risk from the Charcot Extension Project. Our second research question brings in community voices to this environmental justice issue. Orchard School is part of a census tract with 82% minorities, and is in the 95th percentile for air pollution burden. We will use surveys to gather qualitative evidence for attitudes regarding current conditions and future air pollution exposure for students. Our third research question focuses on future steps for the community post-study to share knowledge and work together as participants fighting for environmental justice and equal rights to clean air. This will include leading a PTA discussion following our data collection results to present our findings and discuss potential mitigation solutions if applicable. Table 2 situates these research questions with what we expect to find, already existing data on the topic, methods we will use to answer the question, assumptions, and how we plan to analyze the data we collect.

Table 2: Research Questions.

Research Questions	Hypothesis and Expected Findings	Data and Evidence	Methods	Assumptions and Plans for Data Analysis
<p><b>1. What are current levels of air pollution at Orchard School and the surrounding neighborhood?</b></p>	<p>The Bay Area is considered one of the most polluted metropolitan regions by average year-round concentration of particulate matter (PM2.5). Additionally, Orchard school is already located between highway 880 and Oakland Road which is a major arterial 7-lanes wide. It is expected that a community located in the Bay Area situated next to major roadways would be exposed to major levels of air pollution.</p>	<p>The data from the Environmental Impact Report of the Charcot Avenue Extension shows that the project will have less than a significant impact on air quality, but the assessments are based on theoretical models, not actual measurements on site. Cal Environmental Screen shows census tract data for Orchard School minority population percentages and air pollution risk.</p>	<p>We will collect air quality data using two CPC 3007s for three weeks for 10 minutes each at 6 locations, seven times a week, during morning drop off and recess/lunch times that children are most exposed to outdoor air. We will also collect vehicle counts at the same times for 10 minutes. We will count vehicles and classify vehicle types. We will use GIS to map community demographics and existing data on air pollution. We will ask survey questions.</p>	<p>Assumptions: that data collection is taking place during peak hours of student exposure, that we have accurate pre-existing baseline data for air pollution in San Jose and Santa Clara to compare our results too. Additionally, we plan to analyze baseline data about the impacts on the community that are potentially associated with the Extension Project.</p>
<p><b>2. What are community perceptions on air quality and the Charcot Extension?</b></p>	<p>The community is very concerned about increased exposure and health risks that aren't being addressed by the city. Orchard PTA has drafted a 150 page comment response to the Extension EIR.</p>	<p>Surveys: community members share their opinions on air pollution and the extension project. The purpose: get an understanding of community feelings towards current traffic densities and the modification/mitigation options if the project continues.</p>	<p>We will conduct a survey for teachers, parents, and other community members to share their perceptions of air pollution and safety in their area.</p>	<p>The data acquired from surveying the community will be compiled into an analysis to gain an overall community-wide sense of opinions of the current air pollution levels and the extension project.</p>
<p><b>3. How can Orchard school, local community members, and community based partners continue to build a space for community knowledge on, participation in, and resilience to the Charcot Extension Project, air pollution, and environmental injustice?</b></p>	<p>We will engage with parents, teachers, and students to continue to build a space for community knowledge and participation in their community's battle with environmental justice.</p>	<p>The community leaders and school members hope that all they learn can also be applied to and shared with other people who may need additional guidance through similar situations.</p>	<p>We will present our poster and results at a PTA meeting. We will share all of our data and final report with our community based partners so they may incorporate it in their efforts against the Charcot Extension and for possible mitigation strategies at Orchard. We have incorporated survey questions allowing community members to share their knowledge and opinions on the project, and possible mitigation solutions. We work with students on data collection which will provide examples of resources and methods for continued research after completion.</p>	<p>Assumptions: there are differing levels of participation from every group. Some parents, students, and teachers may not think air pollution or the extension are issues for the school or themselves to be engaged in. This is only a 10 week project so we don't expect to have a major influence on the community, but instead hope to provide some tools for future engagement on the issue.</p>

## **Section 4: Methods**

For this project, we utilized a community-based participatory action research (CBPR) approach. This method's main purpose is to increase the value of research for both the researchers and community under consideration. In order to increase community and researcher values, a greater development of appropriate measurements and a greater understanding of the community's perceptions are sought after. More specifically, the CBPR benefits community participants and researchers by establishing and building connections which enable the sharing of knowledge and experiences (Viswanathan et al., 2004). Furthermore, CBPR research projects become more efficient and effective because of their ability to develop a deeper understanding of the community's unique circumstances establishing a more accurate framework for researcher testing procedures and adapting any practices to the community's specific needs (Hall, 1992). While maintaining a CBPR approach, we developed our research guided methods through a mixed methods approach.

Our mixed methods approach examines the real life threat of environmental injustice for community members of OSD by deeply considering the communal and cultural values that exist alongside the more quantitative measures of air pollution. The literature review was conducted to gain further insights into the key variables influencing air pollution and Orchard School District (OSD). Topics of this literature review included, traffic-related air pollution, mitigation measures, and others, which were all seen through an environmental justice frame. We centralized our literature review and additional methods around an environmental justice frame to highlight the disparities and unequal experiences vulnerable communities live through, like those of Orchard Elementary. In order to analyze the current air pollution levels within and surrounding Orchard Elementary, we used a CPC 3007 device. In addition to collecting measurable data on air pollution, we also conducted a survey to gather community perceptions of air pollution and any foreseeable externalities of the Charcot Extension Project. The ideal outcome is that the surveys would help provide community perceptions not directly brought about through air pollution measurements. With a more generalized understanding of community thoughts of air pollution, building their community knowledge becomes easier because it becomes possible to establish a common baseline of information, which could potentially lead to increased participation in community air pollution and environmental justice issues.

### *Community-Based Participatory Action Research*

#### *Part I: Student Volunteers*

Six Orchard School student volunteers aided in data collection throughout the project. The students were those that had expressed interest in our project to their teachers and were then referred to us for orientation. Four students were in the seventh grade and two were in the sixth grade at the time of this project. The students were not required to help at every data collection and instead, they participated on their own free will. The students were expected, however, to help with at least one data collection per week and stay involved until the data collection portion was finished. The students also did not receive any extra credit for participating and were not given compensation for their help.

*Part II: Air Pollution*

CPC 3007 devices were utilized to measure ultrafine particulate matter in the air (particles/cm<sup>3</sup>). Ultrafine particulate matter has an average diameter of less than 0.1µm which is smaller than PM10 and PM2.5; with diameters of 10µm and 2.5µm, respectively. Data was collected for ten minutes at six locations within Orchard School District (OSD). The following six locations were chosen as general data gathering sites: OSD front office, corner of Oakland Road & Fox Lane, inside OSD Classroom #46, OSD event center steps, playground closest to Silk Wood Lane, and the baseball diamond next to Oakland Road. These are displayed in Figure 1 below.



Figure 1: Data Collection Map.

Air pollution data collection map of Orchard School and surrounding area. Casa de Lago Mobile Home Park locations include: (1) Front Office; (2) Laguna Dr. and Arroyo Dr. intersection; (3) Laguna Dr. and Buena Vista Dr. intersection; (4) Laguna Dr. and Fountain Circle intersection; (5) Arroyo Dr. closest to the edge of the park; and (6) Creekside Dr. and Westwood Dr. intersection. Orchard School District locations include: (7) Oakland Rd. and Fox Ln. intersection; (8) Front Office on Fox Ln.; (9) inside classroom #46; (10) the baseball diamond; (11); the playground near Silk Wood Ln.; and (12) the steps of the event center.

These locations were chosen based on where students frequently gather and may be most exposed to poor air quality. We have a wide array of locations that represent many different and



wide-spread areas of the school grounds. We also decided to include one location that is in an indoor classroom to be able to compare outdoor and indoor air qualities. Many students gather at the OSD front office before and after school, and it is exposed to two single-lane streets. The corner of Oakland Road and Fox Lane is one of the busiest intersections that runs parallel to Orchard, and many students cross the street here. Room #46 is a normal indoor classroom that students gather in. Many students gather, eat lunch, and play at the event steps. Many students also gather and play at the playground, but it is also located next to the busy Silk Wood Lane road. Lastly, the baseball diamond is where the Charcot Extension is proposed so we wanted to get a baseline of air quality here, and it is located next to Silk Wood Lane and Oakland Road which is another very busy intersection. This data collection was also completed under a weekly schedule for three weeks. Due to President's Day (2/17/2020), OSD had a week off from school. Therefore, data collection was separated into two consecutive weeks, one week off, and then one final week. Data collection schedule at OSD is as follows:

- Tuesday (2/4, 2/11, 2/25), 12:17pm--12:47pm
- Wednesday (2/5, 2/12, 2/26), 7:50am--8:20am
- Wednesday (2/12, 2/19, 2/26), 4:00pm--5:00pm
- Friday (2/7, 2/13, 2/28), 7:50am--8:20am
- Friday (2/7, 2/13, 2/28), 2:40pm--3:10pm

Our research group had access to two CPC 3007 devices, which allowed a pair of researchers to individually survey three sites for ten minutes each. By dividing the six measurement sites into two groups, we were able to complete the data collection concurrently. These two groups were maintained throughout all data collection session: Group 1 included the corner of Oakland Road and Fox Lane, the front office, and inside classroom #46; Group 2 measured air pollution at the baseball diamond, playground nearest Silk Wood Lane, and the event center steps. A ten minute set-up time for the CPC devices was also required, increasing our time at Orchard to 40-50 minutes. OSD Students also aided in data collection, but were limited to recording minimum/maximum particulate matter data points and environmental/weather conditions of each session.

Air pollution at Casa de Lago (CDL) was measured in areas of high traffic (Point 1, main office) and areas to serve researcher inquiry. For example, air pollution at points 2, 3, and 4 were taken to see if there was a gradient of UFP concentrations spanning from Highway 880 to the inner parts of CDL. Point 5 was chosen as the point closest to Oakland Road that still lied within the CDL property. Finally, Point 6 was chosen to measure UFP's in the northern area of CDL which also was slightly more protected by greenery to the northwest. UFP measurements were taken for ten minutes to maintain consistency between OSD and CDL. Traffic counts were also taken and recording cars in one direction was chosen randomly during the first data collection. The same traffic flow direction was used for the following data measurements. We measured UFP concentrations and took traffic counts once a week for three weeks after 4:30pm.

### *Part III: Traffic Counts*

Traffic counts were also taken during the same time intervals as air pollution was measured at OSD front office, the corner of Oakland Road & Fox Lane, the playground closest

to Silk Wood Lane, and the baseball diamond next to Oakland Road (Figure 1). Two OSD students were taking the traffic counts of one direction of traffic flow for a ten minute interval. Traffic was organized into seven categories: heavy truck, medium truck (box truck), small truck (personal), bus, car/van/taxi, plane, and other (RV's, motorcycles, etc.) (Figure 2). Traffic flow was chosen to account for all possible traffic passing OSD. At the Oakland Road and Fox Lane data collection site, traffic counts were taken of traffic driving Southeast from Silk Wood Lane to Fox Lane. At the OSD front office, traffic counts were taken of traffic driving Southwest on Fox Lane from Oakland Road. At the baseball field, traffic flowing Northwest from Fox Lane to Silk Wood Lane was recorded. At the playground closest to Silk Wood Lane, traffic driving down Silk Wood Lane from Oakland Road was recorded.

#### *Part IV: Surveys*

A twenty-five question survey was distributed through email, a PTA newsletter, and paper copies for parents and community members over eighteen to complete. This survey asked questions of any perceptions of air pollution, personal experiences with the surrounding air pollution, opinions of current traffic density around OSD, opinions on hypothesized future traffic density around OSD, and demographic details (Appendix B). The survey took anywhere between ten to fifteen minutes to complete and was anonymous. Consent letters and an oral consent to participate was given to the participants by the SCU student researchers.

The survey was used to understand perceptions that exist within the adult community of Orchard School District. The survey allowed us to objectively address what preconceived ideas surrounding air pollution and the Charcot Extension Project and how these ideas may influence overall recognition, or lack thereof, of such issues. The questions were written to address the specific issues of air pollution, traffic density, and their effect of children's health and academic performance. The survey's questions were consciously posed in a way which would not be considered persuasive or authoritative. Such questions were written to be respectful, civil, and appreciative. In that way, we built trust between ourselves and the community members. The combination of our survey findings with our research help provide a deeper understanding of perceptions surrounding air pollution, traffic density, and their effect on children.

#### *Part V: Purpose of Data*

The data collected will be used to provide a more specific context of the environmental issues occurring near and within OSD. The air pollution measurements of UFPs will provide context for what the current air pollution is at OSD and also within a CDL. The traffic data taken in conjunction to the UFP measurements will act to provide information on the relative traffic density and flow, which has additional implications for health and safety concerns. The survey data collected will mainly serve as a measurement of community knowledge and participation with environmental issues and the Charcot Extension Project. Collecting and analyzing all this data will hopefully provide us with a representative measure of the current environmental impacts the community is facing and how they view and act on them.

## Section 5: Results and Findings

### *Air Pollution Data.*

Average UFP per site location over the entire data recording period. See bottom tabs for spreadsheets of locations grouped by meter device and CDL measurements ([link](#)).

### *Traffic Count Data.*

Total number of vehicles passing Orchard School District in respective locations during data collection ([link](#)).

### *Part I: Air Pollution Results*

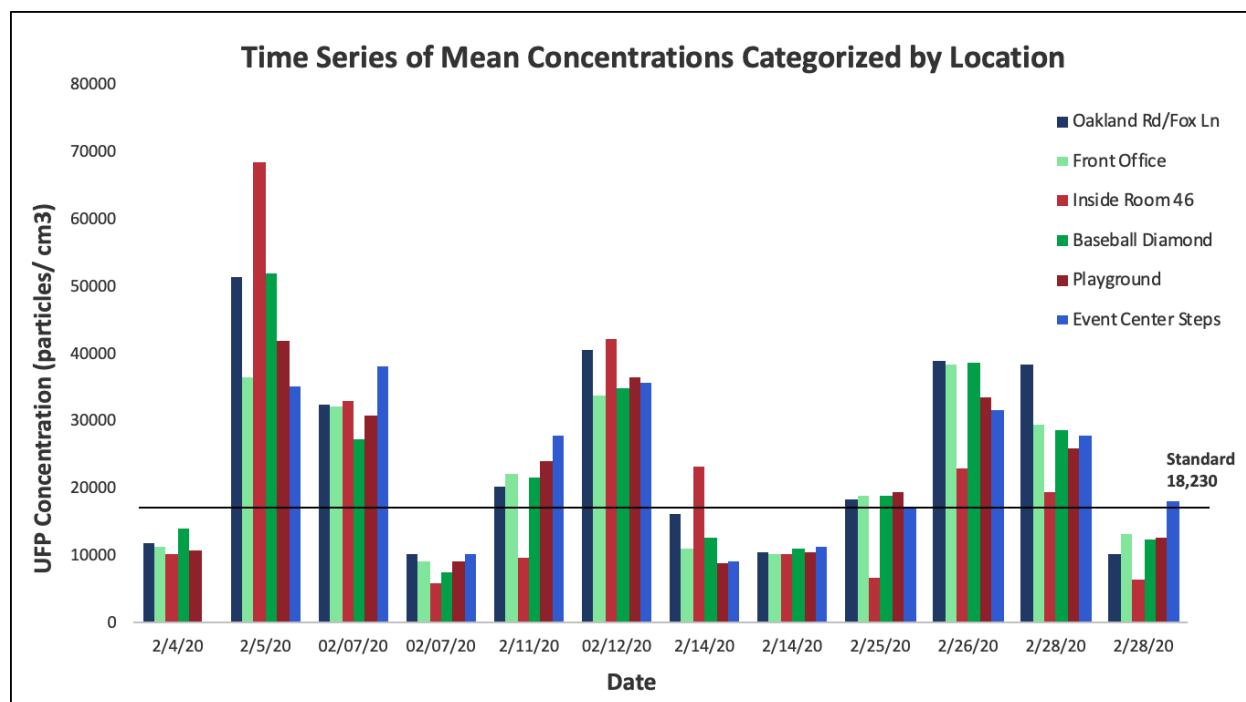


Figure 2: Air Pollution Averages by Date and Location in OSD.

Source: CPC Data Collection January-February 2020

Figure 2 depicts a time series across all of the days air pollution data was collected from February 4- February 28th. The ultrafine particle measurements were recorded in particles/cm<sup>3</sup>, and each bar is coded by location the measurement was taken and shows the mean concentration of that particular 10-minute interval. The black horizontal line shows the standard we are using, derived from a 2016 literature review of ultrafine particles and health impacts. In one study, it was found that outdoor ufp levels were correlated with increased asthma in schoolchildren. The averages recorded in that study were 18,230 #/cc, so we are using this as a baseline number of what may have a potential impact on the kids' health at Orchard School. Unfortunately, ufp and health impacts are still being studied and largely not understood at this point, so getting a

concrete number to compare our data too in terms of the possible magnitude of consequences of our averages was difficult. Additionally, to contextualize our mean concentration findings several studies were reviewed regarding PM2.5 to see if we could correlate our ufp findings with national PM2.5 standards. PM2.5 is actually not directly correlated with the behavior of ultrafine particles, so we left this comparison out.

Almost all of the days we recorded experienced ufp levels above our recommended, and this graph does not depict the “spikes” or maximums that were hit at each location, which are included in the following figure and more accurately describe the total duration each location experienced extra high ufp levels, which we define as greater than 40,000 #/cc.

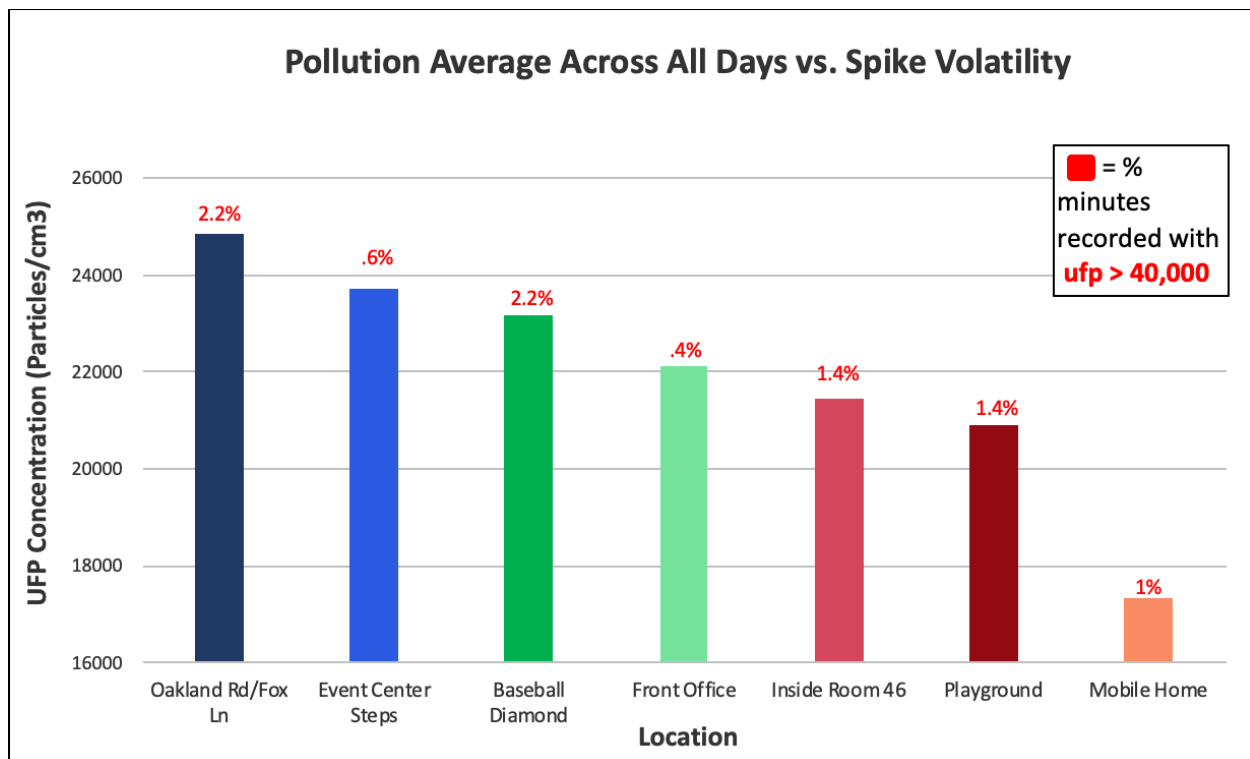


Figure 3: Air Pollution Total Averages by Location vs. Spike Count

Source: CPC Data Collection January-February 2020

Figure 3 depicts overall pollution averages across all recorded days, categorized by location, in order from locations experiencing the highest UFP averages to locations experiencing the lowest ufp average concentrations. The intersection of Oakland Road and Fox Lane had the highest concentration average of 24,861 #/cc. This is hypothesized to be because of the nature of recording directly next to a very busy road and the amount of cars utilizing this path during peak hours, particularly during morning drop-off. However, in general all school locations (excluding the mobile home park) experienced a similar range of UFP concentrations between 20,800-24,861 #/cc. The mobile home park location had the lowest average concentrations, but we only collected data here on three days, and at a different time of day than other locations (around 5-6 PM) so it cannot be directly compared to other location data. We hypothesize that the lower concentration may be due to distance from the freeway, wind flow, and the lack of UFP sources directly within the mobile home park as cars are not frequent and

drive at low speeds. Additionally, there exist more barriers between the mobile home park and the freeway including a sound wall and the mobile homes themselves. With these additional obstacles, wind flow was limited and therefore UFP concentrations may not have been as concentrated as they otherwise would be without the barriers. In comparison, OSD has wire fences and plenty of wind during the day which allows UFPs to freely flow in and out of the campus. An alternative hypothesis is that Orchard School experiences higher UFP concentrations because the source of ufp is not just traffic, but potentially the industrial site neighboring it. The industrial site lies across the school on the other side of Oakland Road. Through researcher observations, multiple heavy trucks and machinery operate in this location. The site appears to be a mineral and landscaping material processing and/or redistribution plant due to the frequent truck movement and loading/unloading.

Figure 3 further shows the volatility of air pollution at each location. Percentages marked in red show the percent of time studied that each location was recorded as being in a “spike”, with a “spike” in ufp levels categorized as 40,000 #/cc or higher. Certain locations like the Event Center Steps or Front Office had relatively high average concentrations compared to other locations, but were more consistent. In contrast, locations like Oakland Road/Fox Lane and the Baseball Diamond had ufp concentrations greater than 40,000 2.2% of the minutes we recorded. They were the most subject to dangerous spikes. Our only indicator of indoor air pollution was the inside of room 46, which was on the lower end of overall ufp concentrations but was still subject to volatile spikes, possibly because of the lack of air circulation possible indoors.

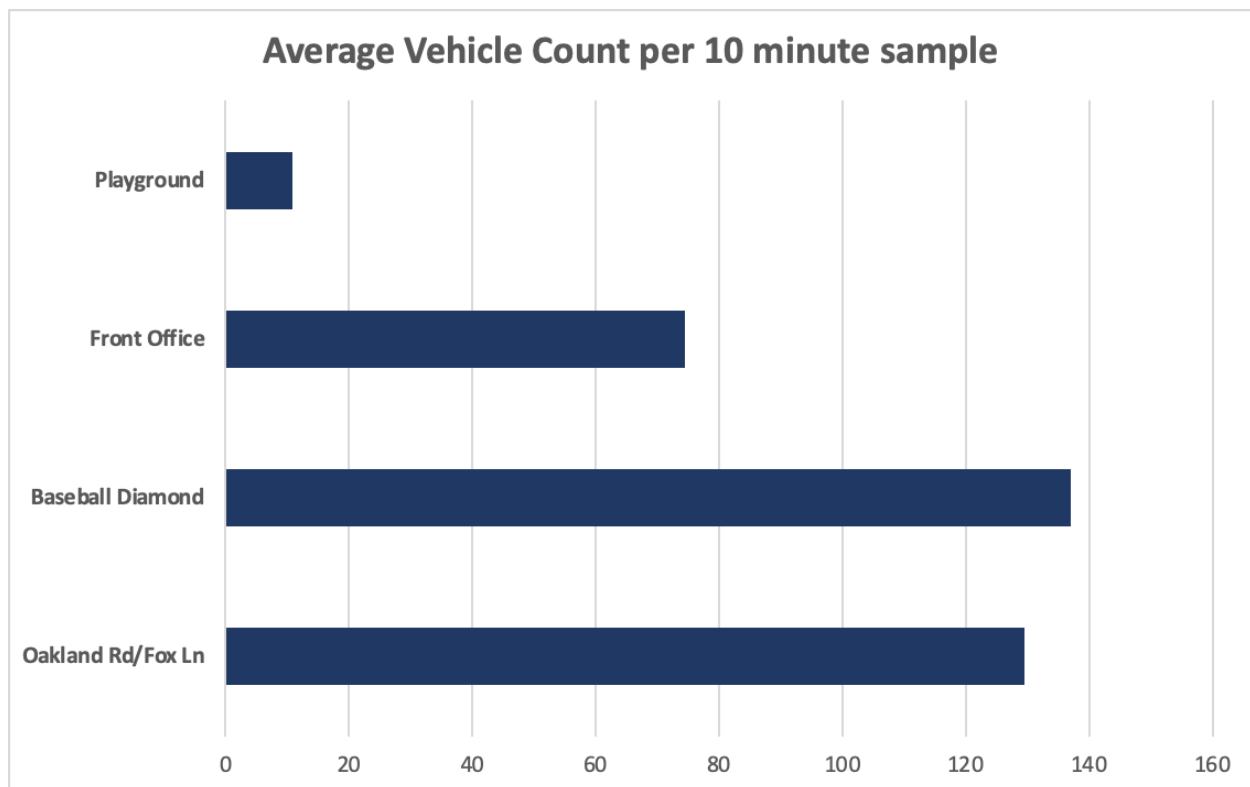


Figure 4: Traffic Counts at OSD Locations.

Figure 4 shows traffic counts for relevant locations, which excludes the Event Center Steps, Inside Room 46, and the Mobile Home Park. Oakland Road/Fox Lane and the Baseball Diamond had very high averages of cars going by, both of which averaged at more than 100 per ten minute interval. Moreover, we only counted cars going one direction because of the amount of researchers we had on hand count traffic, therefore the actual amount of cars passing the area per interval is much higher.

Casa de Lago traffic was significantly less frequent compared to traffic around OSD. Traffic from Oakland Road traveling down Club Drive to Casa de Lago’s main office averaged 50 vehicles per ten minute interval with a high of 55 vehicles over one interval. All other traffic count locations had fewer than ten cars travel within the area per ten minute interval.

*Part II: Survey Results*

Our Surveys asked a variety of questions that all aimed to enhance our analysis on community perceptions on the current air pollution levels and the extension project, demographic and health data, and opinions on possible mitigation measures. These results will begin with demographic data of the survey participants, and then move to perceptions on air quality and traffic, health data, and lastly opinions on the Charcot Extension Project and possible mitigation strategies for the project.

*Statistical Survey Responses*

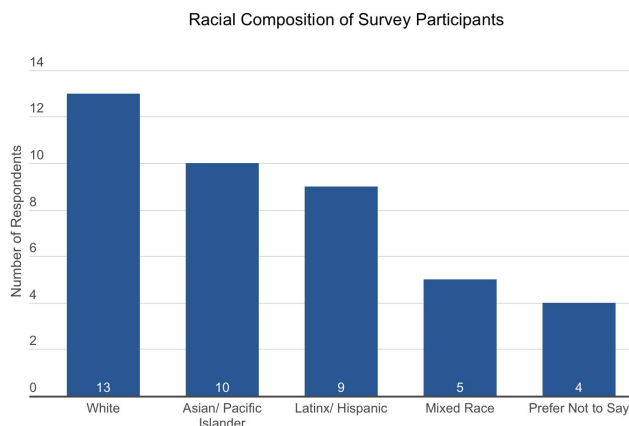


Figure 5.1: Racial Composition.

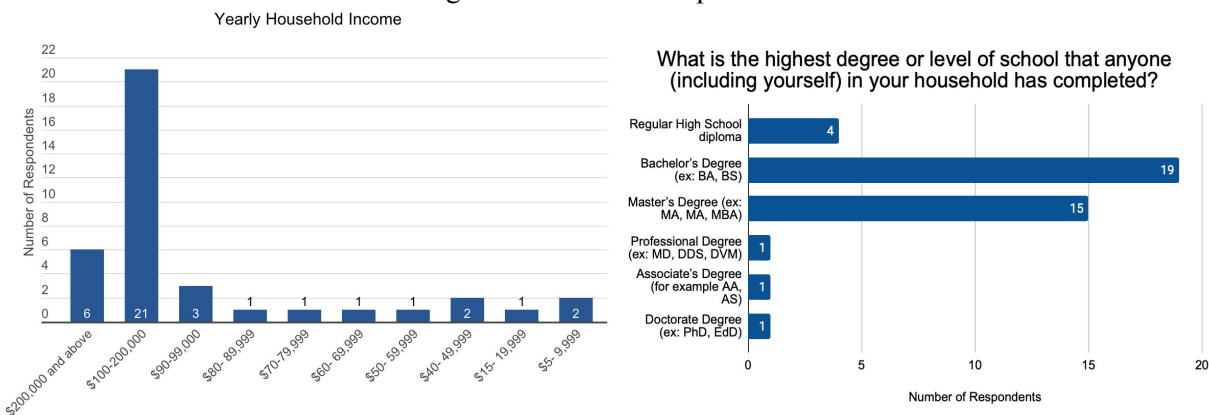




Figure 5.2 Yearly Household Income.

Figure 5.3 Education Level of Survey Participants.

We first wanted to get a sense of the community members who were answering the survey. Therefore, we asked demographic questions pertaining to race, level of education, and yearly household income (Figure 5). The community members we surveyed identified as a multitude of races, many identifying as White, Latinx/Hispanic, Asian, and Mixed Race. A majority of participants recorded themselves as having a yearly household income between \$100,000 and \$200,000 with many other respondents placing themselves in various income levels ranging from \$200,000 and above to between \$5,000 and 9,999. A strong majority of respondents, or someone in their household, have either Bachelor’s or Master’s degrees with a few others having High School, Professional, Associates, or Doctorate degrees.

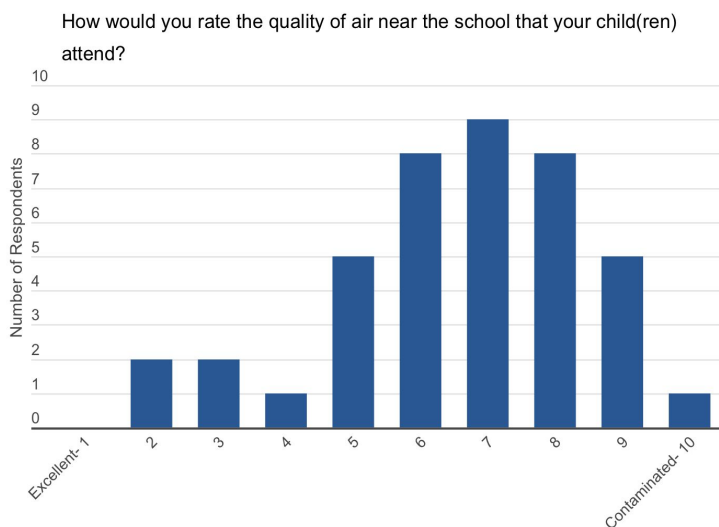


Figure 6.1: Community Perceptions on Air Quality at and around Orchard School.

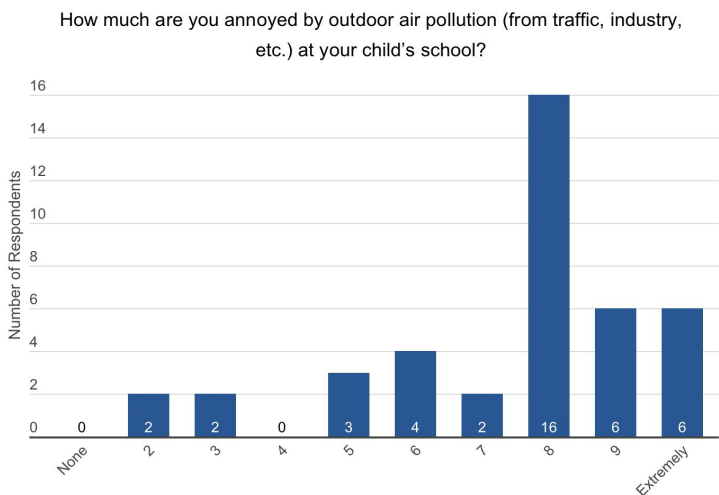


Figure 6.2: Community Perceptions on Outdoor Air Quality and Emission Type at and around Orchard School.

Which of the following would you say are the sources of outdoor or indoor air pollution at the school? Please check either “Yes” or “No” for the following potential sources of pollution.

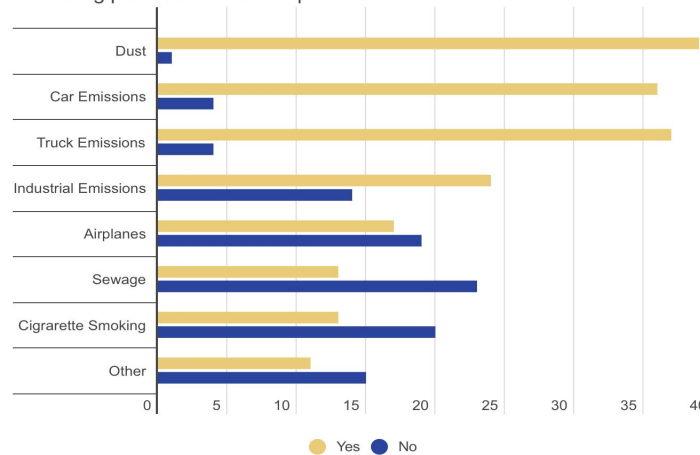


Figure 6.3: Community Perceptions on Emission Type at and around Orchard School.

We wanted to understand the community perceptions on the existing air quality in the encompassing and surrounding area of Orchard School. Therefore, these survey questions aimed to gauge preexisting thoughts on the issue (Figure 6). Respondents generally rate the quality of air near Orchard between 5 and 9 (85%) and the most rating it as a 7 (22%) with 10 being considered contaminated. Respondents are also very annoyed by outdoor air pollution in the area with a large majority (39%) rating their annoyance at a level 8 with many also rating it as a 9 or 10. Within this sphere, there are also questions regarding the presence of types of air pollution in the area. Respondents believe that dust and car, truck, and industrial emissions are the main sources of air pollution at Orchard School; they are least concerned with cigarettes and sewage as pollutants. Overall, respondents believe that air pollution is a present and annoying issue caused mostly by dust and traffic and industrial emissions in the area.

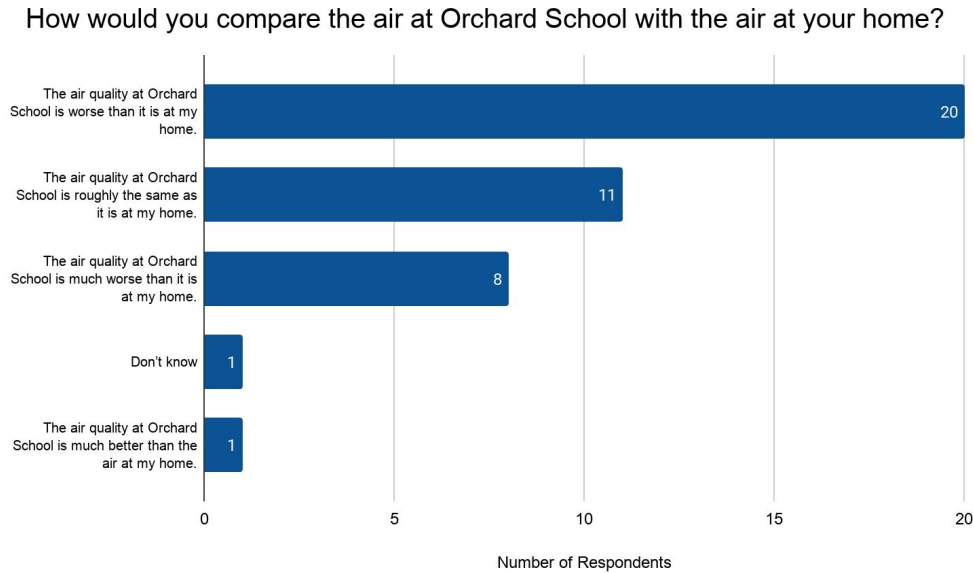


Figure 7: Comparison of air quality at Orchard School and respondents' homes.

We wanted to understand the community perceptions on the existing air quality in the encompassing and surrounding area of Orchard School. Therefore, these survey questions aimed to gauge preexisting thoughts on the issue (Figure 6). Respondents generally rate the quality of air near Orchard between 5 and 9 (85%) and the most rating it as a 7 (22%) with 10 being considered contaminated. Respondents are also very annoyed by outdoor air pollution in the area with a large majority (39%) rating their annoyance at a level 8 with many also rating it as a 9 or 10. Within this sphere, there are also questions regarding the presence of types of air pollution in the area. Respondents believe that dust and car, truck, and industrial emissions are the main sources of air pollution at Orchard School; they are least concerned with cigarettes and sewage as pollutants. Overall, respondents believe that air pollution is a present and annoying issue caused mostly by dust and traffic and industrial emissions in the area.

On a scale from 1 (none) to 5 (extremely high density), what is the level of traffic surrounding Orchard School District on an average day?

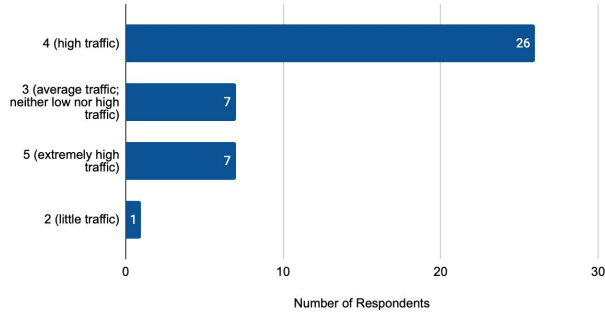


Figure 8.1: Perceptions of Traffic Density

How often do cars pass your child's school during the school day?

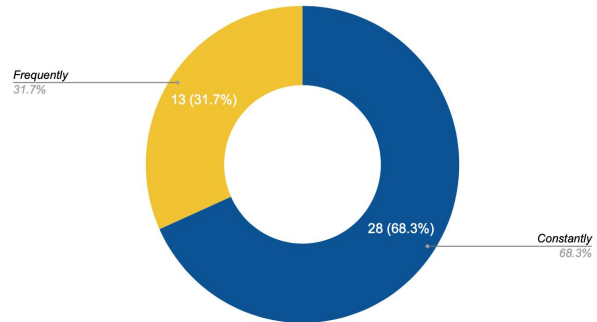


Figure 8.2: Perceptions of Traffic Frequency

On a scale from 1 (not at all) to 5 (extremely), how worried are you of traffic accidents involving pedestrians near Orchard school and in the encompassing neighborhood?

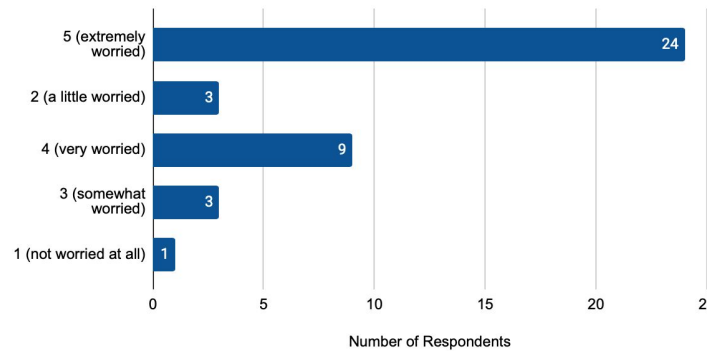


Figure 8.3: Traffic Density and Accidents.

Many survey questions on traffic were asked both in regards to density, type of emissions, and air quality (Figure 8). A majority (63.4%) of respondents perceive the traffic density around Orchard School to be considered high traffic, while an equal percentage believe it to be extremely high or average (17.1% each). All respondents recorded that cars pass by Orchard either frequently (31.7%) or constantly (68.3%) during the school day. Additionally, respondents are particularly worried about traffic-pedestrian accidents around Orchard School. A majority (60%) are extremely worried about this while many others are very worried (22.5%). Because of the perceived high traffic in the area, many respondents are extremely worried about traffic accidents involving themselves, their children, or other pedestrians.

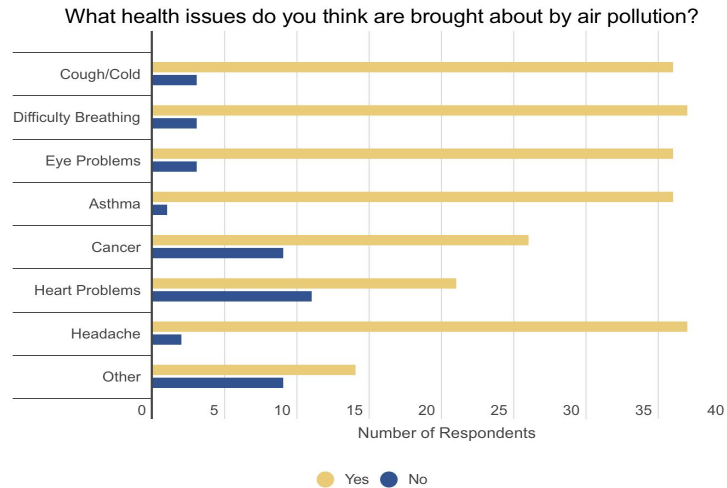


Figure 9.1: Health impacts perceived to be brought on by air pollution

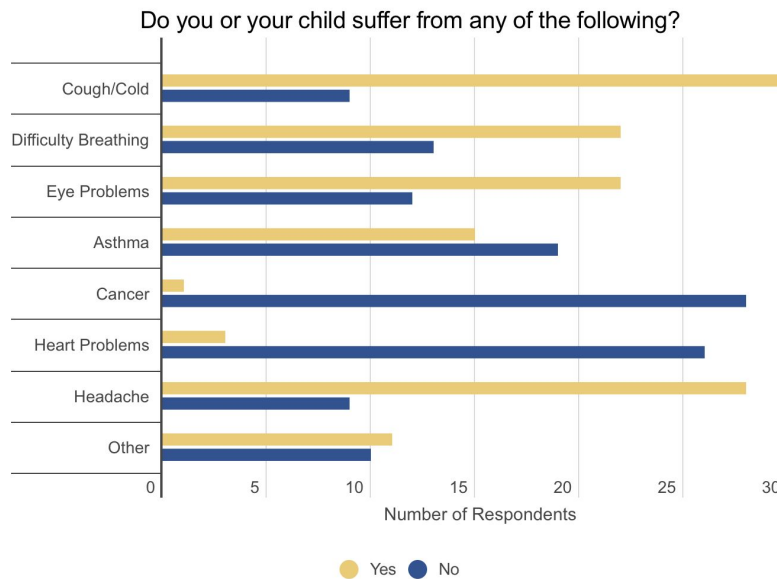


Figure 9.2: Health impacts the community faces at home.

The next set of survey questions asked about perceptions on health impacts brought on by air pollution and any health issues that the respondent or their child(ren) has suffered from (Figure 9). Respondents generally believe that a cough/cold, difficulty breathing, eye problems, asthma, cancer, headaches, and other health issues are brought on by air pollution. Respondents, or their children, generally suffer from a cough/cold, difficulty breathing, eye problems, and headaches; over 50% of the respondents have children that experience some health issue(s) in the realm of: cough/cold, difficulty breathing, eye problems, and headaches. While a majority may not, others still suffer from asthma, cancer, heart problems, and other issues. This shows that many of those in this community face health issues that are also correlated with air pollution. Over 90% of the survey respondents attributed some level of coughs/colds, breathing difficulties, eye problems, asthma, and headache to air pollution.

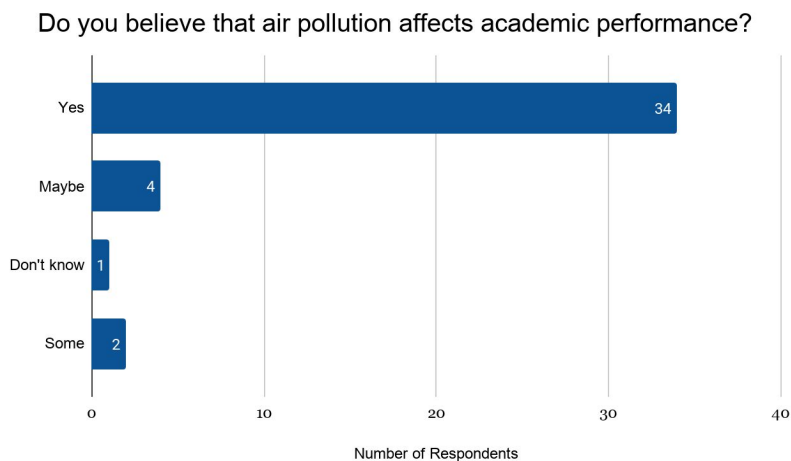


Figure 10: Perception of the correlation between academic performance and air pollution.

Figure 10 shows that an overwhelming majority agree that air pollution impacts the academic performance of students. Along with serious negative physical health consequences, air pollution can have negative consequences on academic performance. 34 out of 41 respondents agreed that air pollution contributes to decreased academic performance. This result symbolizes the fear that parents and teachers have surrounding air pollution's effects on children's health with specific concern on their learning development and brain function. This question was posed in order to quantify the community's fear and understanding of potential impacts that air pollution has on children's academic performance. Overwhelmingly, the members of the community agreed that the more air pollution a school district has, the poorer the academic performance of its students.

### *Open ended Survey Responses*

The following are direct quotes from anonymous survey respondents who wished to express their concerns regarding air pollution, the Charcot Extension Project, and environmental injustice. Survey responses here ([link](#)).

- *I would hope the city would value and consider the views of people directly affected by it (students, parents, teachers, residents) and not just continue with the project because it's easier to continue with a plan put in place many years ago.*
- *Children should come before industry.*
- *This project will bring unnecessary traffic that is not part of our community right through our close knit neighborhood taking some of the school property which affects our students and creating a dangerous environment. This project is very much outdated and should not be considered any longer.*
- *It seems the main objective of the Charcot project is to help ease traffic congestion and move the traffic faster. However, various independent studies show the Charcot road extension only help speed up the traffic flow only a few minutes. This does not justify the amount of money and effort in implementing this project. In addition, The quality of life of the neighborhoods surrounding the school will suffer greatly if the project gets a go*



*ahead. Hence, we believe the city should cancel the project so the money could be wisely spent improving the roads elsewhere*

- *Please do not construct the extension. The students at the school need the field to exercise in and the additional air pollution would make it hazardous to be outside.*
- *Adults who support this project are remiss in their responsibility to create a sustainable future for our children.*

These responses by survey participants all contain themes of concern regarding air pollution, traffic safety for themselves and their children, and general opposition to the extension project. These respondents have a strong desire to keep the extension project out of Orchard School.

## **Section 6: Discussion**

Overall, we found that the air pollution levels at Orchard School were remarkably higher than the standard which we utilized as our main comparison. Furthermore, the UFP air pollution levels were significantly higher at the school's campus than those measured at the Casa de Lago Mobile Home Park. Orchard School is situated in an area with some of the highest air pollution levels in northern California, between 81-90th percentile as identified by CalEnviroScreen, which tracks PM2.5, ozone, diesel particulate matter exposure, and other contaminants to identify communities with the highest environmental burdens in combination with socioeconomic burdens. Although UFP health consequences are readily identified, more studies need to be done to determine what exposure levels have a major impact on health. It is unclear how the average UFP concentrations recorded at Orchard School impact the community currently, but it is an additional concern to their population who is already dealing with dangerous exposure to other air pollutants. Traffic counts documented seem correlated with locations that had the highest UFP levels, therefore it is very concerning that an additional 15,000 vehicles would be placed directly next to the school, as we noticed increased impact from locations that were exposed to 130-137 cars per 10 minute interval.

In addition, our survey results displayed an overall negative perception of air pollution exhibited by the community members of the Orchard School District. In addition, the community members held a comprehensive understanding of the issues air pollution brings to both physical health as well as academic performance. The community's fears regarding air pollution's effects on children's health, specifically cognitive development respiratory ailments, and academic performance were overwhelmingly unanimous. Many questions posed by our survey addressed the quality of the air in and around the Orchard School. The responses to such questions indicated a deep understanding of the problems associated with air pollution as a whole as well as how and why it is an issue not only in our country as a whole but specifically at the school in which their children, or they themselves, spend over thirty-five hours a week. It is important to remember that these responses were provided by adult members of the OSD community which include teachers as well as parents, many of whom serve on board of the Parent Teacher Association. Furthermore, our survey results also revealed that the residents and Orchard School community members are aware of the Charcot Extension Project, understand its goals and plans, and are adamantly against its construction. Not only that, but they also believe the Extension Project would worsen both air pollution, and the negative consequences associated with it, as well as traffic-pedestrian issues. While the city of San Jose may argue that the Project is safe, attainable, and even sustainable, the members of the community have a counter opinion. The results of the survey indicate that the very people who will be impacted most by the implementation of the Charcot Extension Project are the very people who most reject and renounce its plan of construction.

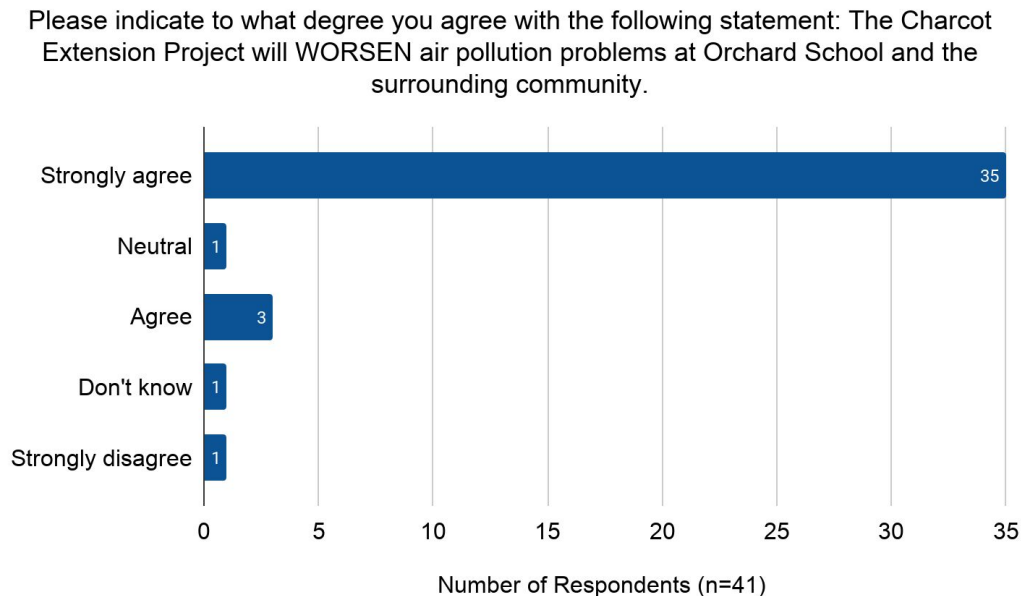


Figure 11: Survey Question 14. Investigating community perceptions about the impacts of the Charcot Extension Project and air pollution.

Figure 11 is survey question #14 which we hold as an emblem of our project as a whole. This question alone could summarize the main goal of our overarching research. It is significant, then, to notice that 27 out of 32 respondents to this question, nearly 85%, agreed that the implementation of the Charcot Extension Project would make air pollution problems at Orchard School worse. This proves that the community impacted most by such an implementation are aware of the issue at hand, understand its consequences, and resist the negative associations with such a project proposal. This will be useful for our partners as the school and its community members are the ones in opposition to the project, and yet they are the ones who will experience the negative consequences.

## **Section 7: Limitations & Critical Reflection**

A main limitation for this project was the time constraint. We were only able to measure air quality for three weeks, with a one week break because of Orchard School's vacation time. Ideally, it would be better to measure for a longer period of time, but since it is only a 10 week course, we were limited. In a longer period of time, we would have been able to conduct more surveys and interviews which could have only added to the fullness of our analysis and results. Additionally, trust is a main component in community engaged research which oftentimes must be built over a long period of time and includes long-term engagement. Because of the 10 week timeline, trust had to be built fairly quickly and may not have been fully developed while conducting this product. Also, this project will not be able to extend for a longer period of time to continually work with this community on this important persistent issue. We do hope that our work can act to help or guide future endeavors of Orchard School and proponents of the Charcot Extension through providing baseline data, an analysis and community perceptions on mitigation strategies, and providing a template and research strategies for future air quality monitoring. Lastly, we had planned to conduct interviews and sent out emails to a few community members, but we either did not hear back or did not hear back in time to actually conduct the interviews. Scheduling interviews is oftentimes an intensive process that required both more time and more people to ask to interview for this project.

The second limitation was the seasonal constraint which meant that we only took measurements during the end of winter. Studies suggest that wintertime conditions allow for greater particle formation, perhaps because of increased condensation of organic vapors coupled with decreased atmospheric mixing depth (Jeong et al., 2004). The BAAQMD has determined that "Santa Clara County experiences many exceedances of the PM<sub>2.5</sub> standard each winter. This is due to the high population density, wood smoke, industrial and freeway traffic, and poor wintertime air circulation caused by extensive hills to the east and west that block wind flow into the region."(2019) This means that our results may be more representative of winter months and thus show higher rates of air pollution than if we measured during the summer. However, at this point, we do not know if this scenario is correct because weather and other conditions are always changing. Additionally, all of our pollution data collections were during the month of February. For February 2020, San Jose's air quality was designated as moderate for 8 days out of the 29 (2/1, 2/6, 2/7, 2/8, 2/15, 2/20, 2/21, 2/22, 2/27, 2/28) (AirNow, 2020). All other days were designated good. We only measured two times (2/7 & 2/27) on a moderate day.

The third limitation was the accessibility constraint. Surveys were conducted primarily online and only in English and Spanish. This excludes those who do not have internet access and those who are not fluent in English or Spanish. Additionally, surveys take time to be completed so those who do not have the ability to appropriate free time to doing this are most likely not able to participate. Other factors such as citizenship, lack of a position of power, or general uncomfortableness could inhibit people from taking a survey or being willing to be interviewed.

The last limitation was a tools constraint. We were only able to use a CPC 3007 provided by Santa Clara University which measures the concentrations of UFPs. UFPs are currently still understudied and there are no state or national standards for these. For references for our concentration number, we were only able to find a few studies that directly measure UFP concentrations, especially in relation to health impacts in children. Additionally, with the CPC 3007 we used, we were unable to gather data on particulate size which also impacts the effects

on general health, and would have helped aid us in comparing PM2.5 and UFPs to better understand impacts.

## Section 8: Conclusion & Recommendations

### Research Questions Recap

1. What are current levels of air pollution at Orchard School and the surrounding neighborhood in relation to local demographics?
2. What are community perceptions on this issue?
3. How can Orchard school, local community members, and community based partners continue to build a space for community knowledge and participation in issues of environmental justice?

### Part I: Conclusion

In conclusion, we found that the current levels of air pollution (UFPs) at Orchard School exceed the threshold associated with known health impacts in children. This is indicative of the fact that the levels of air pollution measured at the Orchard School campus were notably higher than not only the standard utilized throughout our project, but also notably higher than the Casa de Lago Mobile Home Park, where many of the students of Orchard School and their families live. In addition, we expected that the Casa de Lago Mobile Home Park would have the highest location average of air pollution recordings, but our study found that it was actually the intersection of Oakland Road and Fox Lane that had the highest averages and highest exposure to spikes in levels. Furthermore, members of the Orchard School community hold many perceptions, opinions, concerns, and ideas surrounding air pollution that our project wanted to consider and address. Community members of the Orchard School District have significant negative perceptions on air pollution, and are aware of health issues that this can bring. Not only that, but the community members are aware of the Charcot Extension Project, understand its goals and plans, and are adamantly against its construction. Finally, the community of Orchard School will continue to facilitate a space with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project.

### Part II: Recommendations

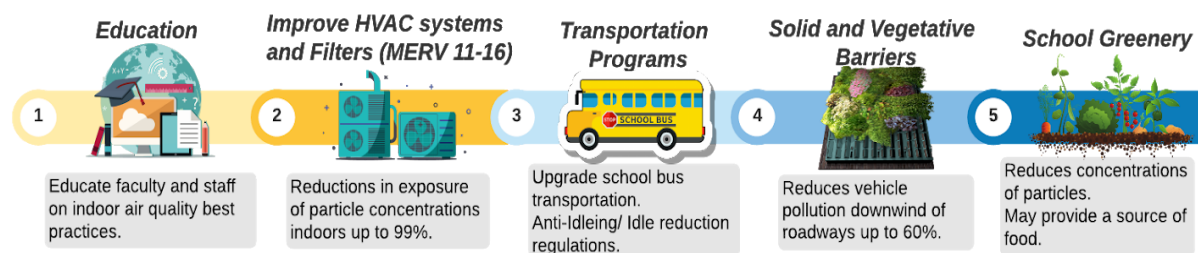


Figure 12: Pertinent mitigation strategies presented as an infographic.

The results of this project's literature review, air pollution measuring, traffic counts, and surveys demonstrates the critical need of not only further community action against the establishment of the Charcot Extension, but action to reduce the current levels of and student exposure to air pollution at Orchard School. While many community members believe that the

Charcot Extension Project would make air quality at Orchard worse, our findings show that air pollution is *already* an issue to be addressed. Therefore, we have recommendations and resources for future actions to be taken to not only help mitigate air pollution in the area, but, most importantly, help improve the lives of students who attend Orchard School.

Our first recommendation is to further research and integrate effective educational strategies into pre-existing or newly introduced curriculum. We believe it is important to not only educate the students themselves on air pollution issues and the health problems associated with them, but it is also important to educate the adult members of the community as well. Even parents should understand the nuances of health issues associated with high levels of air pollution in order to protect both themselves and other members of the community from such issues. Understanding the ramifications of the human causes of air pollution, and how and why they end up where they do, is a first step to slowing the processes of air pollution and the negative impacts associated with them.

Our second recommendation is for Orchard School to begin to further integrate mitigation strategies now to better the current air quality. The possible air pollution mitigation measures mentioned in the Literature Review are measures that Orchard school could be implementing now to reduce existing air pollution and could reduce additional pollution if the Charcot Extension moves forward (Table 5). While these recommendations are a start in addressing ways in which Orchard school can mitigate air pollution in schools, there are also measures that local, state, and national governments should be implementing now to improve air quality for all children in schools. These are only recommendations for Orchard school to introduce to help protect their students from air pollution, but further action needs to be demanded for and taken by larger institutions to affect productive wide-scale change for all students facing pollution at school. Below is a table offering resources to help implement a few strategies.



Table 3: Resources for implementing some mitigation measures.

Potential Air Pollution Mitigation Strategies	Resources for Implementing
Double pane windows and air seals & Improve HVAC system design and add high quality Filters (MERV 11-16)	<p>There may be federal, state, and local grants, loans, and rebates for introducing energy efficient projects which retrofitting HVAC systems may be considered. This <a href="#">report</a> funded by the U.S. Department of Energy is a great guide for figuring out ways to fund energy efficient upgrades for school districts.</p> <p>Examples of Programs:</p> <p>The U.S. Department of Energy (DOE) has created a public/private partnership called <a href="#">EnergySmart Schools</a> to support energy efficiency improvements in K-12 schools. The financing options include revolving investment funds, debt financing, and energy-saving performance contracts. DOE also offers access to software programs that can calculate the life-cycle analysis of an energy-efficient retrofit project.</p> <p>The <a href="#">Bright Schools Program</a> provides assistance and funding in retrofitting energy efficient systems such as HVAC systems.</p>
Implement anti-idling/idle reduction policies	<p>The EPA offers this <a href="#">toolkit</a> for schools to reduce idling. Schools may post anti-idling signs or work with the school board on a district wide campaign.</p>
Upgrade school bus transportation	<p><a href="#">The Clean Diesel Program</a> provides grants and rebates for projects that protect human health and improve air quality by reducing harmful emissions from diesel engines. This includes rebates for old diesel using school buses. Roughly \$40 million was available in 2019 for projects that significantly reduce diesel emissions.</p>
School Gardens	<p>Slow Food USA offers an extensive <a href="#">webpage</a> on school garden resources including a garden guide, grants, and academic research on the positives of school gardens.</p> <p>The UC Division of Agriculture and Natural Resources gives <a href="#">advice</a> on school gardening including planning, grants, and activities.</p> <p>Santa Clara University has introduced <a href="#">BUG</a> (Bronco Urban Gardening) with marginalized schools that supports their garden projects and creates hands-on experiences with students and teachers. There may be future opportunities to work with local organizations and institutions such as SCU to provide food justice for Orchard's community.</p>

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## Appendix A

Table 1: Traffic Count Data Table

[Air Pollution & Traffic Count Tally Sheet](#)

Student Name(s): \_\_\_\_\_

Location: \_\_\_\_\_ Coordinates: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time End: \_\_\_\_\_

Elevation: \_\_\_\_\_ Direction From: \_\_\_\_\_ Direction To: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_ Wind Direction: \_\_\_\_\_

Meter Number \_\_\_\_\_







**Air Pollution**

Concentration minimum: \_\_\_\_\_ Concentration maximum: \_\_\_\_\_

Concentration mean/average: \_\_\_\_\_

Notes: \_\_\_\_\_

**Traffic Count Tally**

Heavy Truck (semi)		
Medium Truck (box)		
Small Truck (personal)		
Bus		
Car/Van/Taxi		
Plane		
Other: please specify		

*Appendix B -- English Survey*

*English Survey*

**Survey of Community Perceptions of Air Quality  
and the Charcot Extension Project**

**Introduction**

Thank you for agreeing to complete the Survey of Community Perceptions of Air Quality and the Charcot Extension Project. Your participation is very important and helpful.

We would like you to understand that this survey is about perceptions of air quality and environmental hazards in and around your child's school, Orchard Elementary, and your home; we will not attempt to determine your name or your child's name, academic achievement, or documentation status.

Completing this survey is voluntary. If you are not comfortable answering a question, just leave it blank. DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write.

Please carefully note that some questions are about your current perceptions of the air quality, while others are about the Charcot Extension Project and its potential impact.

Please read every question carefully, and answer them completely and honestly.

Thank you very much for completing this survey!

1. How would you rate the **quality of air** near the **school** that your child(ren) attend?

*Please circle the number that best describes your perception of air quality at your child's school.*

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<i>Excellent air quality</i>					<i>Highly contaminated air</i>					

2. How much are you **annoyed** by outdoor air pollution (from traffic, industry, etc.) at your child's **school**?

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<i>Not annoyed at all</i>					<i>Intolerable annoyance</i>					

3. How often do cars pass your child's school during the school day?

- a. Constantly
- b. Frequently
- c. Seldom
- d. Never
- e. Don't know

4. How often do heavy vehicles (e.g. trucks/buses) pass your child's school during the school day?

- a. Constantly
- b. Frequently
- c. Seldom
- d. Never
- e. Don't know

5. How many **total lanes** does the largest road have that is within 150 feet (or 50 meters) of your child's **school** have?

*Please circle all that apply*

- a. One
- b. Two (one in each direction)
- c. Three (left hand turn lane)
- d. Four
- e. Five
- f. Six
- g. It is a major freeway
- h. It is a major expressway
- i. Live near an intersection



j. Other: \_\_\_\_\_

6. How often do you hear airplanes around your child's school during the school day?

- a. Constantly \_\_\_\_\_
- b. Frequently
- c. Seldom
- d. Never
- e. Don't know

7. Which of the following would you say are the **sources** of outdoor or indoor air pollution at the school?

*Please check either "Yes" or "No" for the following potential sources of pollution.*

- a. Dust: Yes\_\_\_ No\_\_\_.
- b. Car emissions: Yes\_\_\_ No\_\_\_.
- c. Truck emissions: Yes\_\_\_ No\_\_\_.
- d. Industrial emissions: Yes\_\_\_ No\_\_\_.
- e. Airplanes: Yes\_\_\_ No\_\_\_.
- f. Sewage: Yes\_\_\_ No\_\_\_.
- g. Cigarette smoking: Yes\_\_\_ No\_\_\_.
- h. Other sources: \_\_\_\_\_ Yes\_\_\_ No\_\_\_.
- i. Other sources: \_\_\_\_\_ Yes\_\_\_ No\_\_\_.

8. How severe would you say is **air pollution** near your child's school is from:

- a. Dust: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- b. Car emissions: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- c. Truck emissions: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- d. Industrial emissions: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- e. Aircraft: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- f. Sewage: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- g. Cigarette smoking: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- h. Other \_\_\_\_\_: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.
- i. Other \_\_\_\_\_: None\_\_\_, Low\_\_\_, Moderate\_\_\_, High\_\_\_, Very High\_\_\_.

9. What health problems do you think are brought about by air pollution?

- a. Cough/cold: Yes\_\_\_ No\_\_\_.
- b. Difficulty breathing: Yes\_\_\_ No\_\_\_.

- c. Eye problems: Yes\_\_\_ No\_\_\_.
- d. Asthma: Yes\_\_\_ No\_\_\_.
- e. Cancer: Yes\_\_\_ No\_\_\_.
- f. Heart problems: Yes\_\_\_ No\_\_\_.
- g. Headache: Yes\_\_\_ No\_\_\_.
- h. Other \_\_\_\_\_: Yes\_\_\_ No\_\_\_.
- i. Other \_\_\_\_\_: Yes\_\_\_ No\_\_\_.

10. Do you or your child suffer from any of the following?

- a. Cough/cold: Yes\_\_\_ No\_\_\_.
- b. Difficulty breathing: Yes\_\_\_ No\_\_\_.
- c. Eye problems: Yes\_\_\_ No\_\_\_.
- d. Asthma: Yes\_\_\_ No\_\_\_.
- e. Cancer: Yes\_\_\_ No\_\_\_.
- f. Heart problems: Yes\_\_\_ No\_\_\_.
- g. Headache: Yes\_\_\_ No\_\_\_.
- h. Other \_\_\_\_\_: Yes\_\_\_ No\_\_\_.
- i. Other \_\_\_\_\_: Yes\_\_\_ No\_\_\_.

11. Do you believe that air pollution affects academic performance?

- a. Yes
- b. No
- c. Some
- d. Maybe
- e. Don't know

12. During an average week, what method of transportation does your child most often commute to school by?

- a. Walk
- b. Bike
- c. By car
- d. Public transportation
- e. Other: \_\_\_\_\_

13. Are you familiar with the Charcot Extension Project?

- a. Yes
- b. No
- c. A little
- d. Not familiar

14. Please indicate to what degree you agree with the following statement: *The Charcot Extension Project will worsen air pollution problems at Orchard Elementary and Middle school, and the surrounding community.*

- a. Strongly agree
- b. Agree

- c. Neutral
- d. Disagree
- e. Strongly disagree
- f. Don't know

15. Please indicate to what degree you agree with the following statement: *The Charcot Extension Project will make it harder for students to go to and attend school.*

- a. Strongly agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly disagree
- f. Don't know

16. Please indicate to what degree you agree with the following statement: *The Charcot Extension Project will worsen air pollution problems in the area where children attend school.*

- a. Strongly agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly disagree
- f. Don't know

17. What mitigation strategies do you think would provide the students the most protection from the Charcot Extension Project?

- a. Pedestrian bridge
- b. Heating, ventilation, and air conditioning replacement within the classrooms
- c. Adding double paned windows
- d. Distributing face masks
- e. Other: \_\_\_\_\_
- f. I don't know

18. How would you compare the air at Orchard School with the air at your home?

- a. The air quality at Orchard School is much better than the air at my home.
- b. The air quality at Orchard School is better than the air at my home.
- c. The air quality at Orchard School is roughly the same as it is at my home.
- d. The air quality at Orchard School is worse than it is at my home.
- e. The air quality at Orchard School is much worse than it is at my home.
- f. Don't know

19. On a scale from 1 (none) to 5 (extremely high density), what is the level of traffic surrounding Orchard School District on an average day?

- a. 1 (none/no traffic at all)
- b. 2 (little traffic)
- c. 3 (average traffic; neither low nor high traffic)

- d. 4 (high traffic)
  - e. 5 (extremely high traffic)
20. On a scale from 1 (not at all) to 5 (extremely), how worried are you of traffic accidents involving pedestrians near Orchard school and in the encompassing neighborhood?
- a. 1 (not worried at all)
  - b. 2 (a little worried)
  - c. 3 (somewhat worried)
  - d. 4 (very worried)
  - e. 5 (extremely worried)
21. What is the distance between your home/place of residence and Orchard School?
- a. Within a few blocks
  - b. In the same neighborhood
  - c. Less than a mile
  - d. Between 1-2 miles
  - e. Between 2-5 miles
  - f. More than 5 miles
22. What is the highest degree or level of school that anyone (including yourself) in your household has completed?
- a. No Schooling Completed
  - b. Grade 1 – 11; Specify Grade \_\_\_\_\_
  - c. 12th Grade
  - d. Regular High School diploma
  - e. GED or alternative credential
  - f. Associate's Degree (for example AA, AS)
  - g. Bachelor's Degree (ex: BA, BS)
  - h. Master's Degree (ex: MA, MA, MBA)
  - i. Professional Degree (ex: MD, DDS, DVM)
  - j. Doctorate Degree (ex: PhD, EdD)
23. What was your household's estimated total income in the last year?
- a. Less than \$4,999
  - b. \$5,000- 9,999
  - c. \$10,000- 14,999
  - d. \$15,000- 19,999
  - e. \$20,000- 29,999
  - f. \$30,000- 39,999
  - g. \$40,000- 49,999
  - h. \$50,000- 59,999
  - i. \$60,000- 69,999
  - j. \$70,000- 79,999
  - k. \$80,000- 89,999
  - l. \$90,000- 99,999

- m. \$100,000-200,000
- n. 200,000 and above

24. What is your race? (Circle all that are true for you)

- a. White
- b. Black or African American
- c. American Indian or Alaska Native
- d. Asian Indian
- e. Chinese
- f. Filipino
- g. Other Asian: \_\_\_\_\_
- h. Japanese
- i. Korean
- j. Vietnamese
- k. Native Hawaiian
- l. Guamanian or Chamorro
- m. Samoan
- n. Other Pacific Islander: \_\_\_\_\_
- o. Some other race: \_\_\_\_\_

25. Is there anything else that you would like to add regarding the Charcot Extension Project?

*Appendix C -- Spanish Survey*

*Spanish Survey*

**Encuesta Sobre Las Percepciones Comunitarias  
sobre la Calidad y Contaminación del Aire**

Gracias por haber aceptado completar la encuesta sobre las percepciones de la calidad y contaminación del aire en su comunidad. Su participación es muy importante y útil.

Fecha:

Estimado (a) Padre de familia

Son Katherine, Olivia, Juliette, y Cory. Junto con el profesor Christopher Bacon, estoy llevando a cabo un estudio de investigación para comprender la distribución de la exposición a altas concentraciones de contaminantes peligrosos en el Orchard escuela y de identificar estrategias de mitigación potencialmente útiles y preferidos a nivel local.

Estoy solicitando su participación llenando una encuesta, que durará aproximadamente 10 minutos. Su participación en este grupo es voluntaria. Si usted decide no responder a una pregunta, no participar, o retirarse del estudio por completo en cualquier momento no hay problema, es decir no habrá penalización o castigo ni afectará su tratamiento. Los resultados del estudio de investigación pueden ser publicados, pero no vamos y anotar su nombre ni el nombre de su hijo(s) o hija(s).

Aunque puede que no haya un beneficio directo para usted, el posible beneficio de su acceso a la participación de los resultados preliminares y el desarrollo de estrategias más efectivas para crear comunidades saludables y sostenibles.

Al entregar una copia de una encuesta completada representa su permiso de participar.

Si tiene alguna pregunta relacionada con el estudio de investigación, por favor llámame marcando el siguiente número de teléfono: (011) (408)551-3082, en California o envíe un correo electrónico a cbacon@scu.edu.

Atentamente,

Katherine, Olivia, Juliette, y Cory.

Si usted tiene alguna pregunta sobre sus derechos como sujeto/ participante en esta investigación, o si usted siente que ha sido colocado en situación de riesgo, puede ponerse en contacto con el Presidente del Comité de Sujetos Humanos (011) (408)554.5591.

1. Cómo calificaría la calidad del aire cerca de la **escuela** que su hijo(os) asisten?

*Esta escala permite que exprese su opinión personal con respecto a la siguiente pregunta de la **calidad del aire** donde usted vive. Usted puede indicar su percepción de la calidad del aire en esta escala de 0 a 10, donde 0 significa aire excelente y 10 aire altamente contaminado. Esta misma escala será utilizada para las siguientes dos preguntas.*

**Por favor marque el número que mejor describa su calificación de la calidad del aire de la escuela de su hijo(os).**

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<i>Excelente Calidad de Aire</i>						<i>Aire es altamente contaminado</i>				

2. Que tanta irritación te cause la contaminación del aire (del tráfico, industria, etc.) en la escuela de tu hijo/a.

**Marque con un círculo el número que mejor describe su nivel de molestia.**

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<i>No me irrita en lo absoluto</i>						<i>Irritacion Intolerable</i>				

3. ¿Con qué frecuencia pasan **automóviles** durante el tiempo escolar?
- Constantemente
  - Con frecuencia
  - Casi Nunca
  - Nunca
  - No se
4. ¿Con qué frecuencia pasan automóviles **grandes (camiones/autobús)** durante el tiempo escolar?
- Constantemente
  - Con frecuencia
  - Casi Nunca
  - Nunca
  - No se

5. ¿Cuanto **carriles en total** tiene la carretera más grande que está dentro de 150 ft (46 metros) de la **escuela** de tu hijo/a.?

*Circule todas las opciones que apliquen.*

- a. Una
- b. Dos (una en cada dirección)
- c. Tres (carril para dar vuelta a la izquierda)
- d. Cuatro
- e. Cinco
- f. Seis
- g. Es una autopista interestatal (como 880, 280)
- h. Es una autopista expressway (como Almaden, Lawrence, San Tomas Expwy)
- i. Vivo cerca de una intersección.
- j. Otra: \_\_\_\_\_

6. ¿Con qué frecuencia escucha aviones cerca de la escuela de tu hijo/a durante el día escolar?

- a. Constantemente
- b. Con frecuencia
- c. Casi Nunca
- d. Nunca
- e. No se

7. ¿Cual de estos, usted diría, son **fuentes** de contaminación interior y exterior en la escuela?

*Por favor marque "Sí" o "No" para las siguientes fuentes de contaminación.*

- a. Polvo: Si \_\_\_ No \_\_\_.
- b. Emisiones de Auto: Si \_\_\_ No \_\_\_.
- c. Emisiones de Camión: Si \_\_\_ No \_\_\_.
- d. Emisiones Industrial: Si \_\_\_ No \_\_\_.
- e. Aviones: Si \_\_\_ No \_\_\_.
- f. Aguas Residuales: Si \_\_\_ No \_\_\_.
- g. Fumar Cigarrillos: Si \_\_\_ No \_\_\_.
- h. Otras Fuentes: \_\_\_\_\_ Si \_\_\_ No \_\_\_.
- i. Otras Fuentes: \_\_\_\_\_ Si \_\_\_ No \_\_\_.

8. ¿Qué tan severa, usted diría, es la **contaminación del aire** cerca de la escuela de su hijo/a es:

- a) Polvo: Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- b) Emisiones de los vehículos: Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- c) Emisiones industriales: Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- d) Aviones: Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.



- e) Alcantarillado maloliente:  
 Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- f) La fuma de cigarrillos:  
 Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- g) Otra fuente:  
 Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.
- h) Otra fuente:  
 Muy bajo \_\_\_\_, Bajo \_\_\_\_, Moderado \_\_\_\_, Alto \_\_\_\_, Muy alto \_\_\_\_.

9. ¿Que problemas para la salud, usted cre, trae el aire contaminado?

- a. Tos/Resfriado: Si \_\_ No \_\_.
- b. Dificultades para Respirar: Si \_\_ No \_\_.
- c. Problemas de Vista: Si \_\_ No \_\_.
- d. Asma: Si \_\_ No \_\_.
- e. Cancer: Si \_\_ No \_\_.
- f. Problemas Cardiacos: Si \_\_ No \_\_.
- g. Dolor de Cabeza: Si \_\_ No \_\_.
- h. Otro \_\_\_\_\_: Si \_\_ No \_\_.
- i. Otro \_\_\_\_\_: Si \_\_ No \_\_.

10. ¿Usted o su hijo/a padece de algunos de estos?

- a. Tos/Resfriado: Si \_\_ No \_\_.
- b. Dificultades para Respirar: Si \_\_ No \_\_.
- c. Problemas de Vista: Si \_\_ No \_\_.
- d. Asma: Si \_\_ No \_\_.
- e. Cancer: Si \_\_ No \_\_.
- f. Problemas Cardiacos: Si \_\_ No \_\_.
- g. Dolor de Cabeza: Si \_\_ No \_\_.
- h. Otro \_\_\_\_\_: Si \_\_ No \_\_.
- i. Otro \_\_\_\_\_: Si \_\_ No \_\_.

11. ¿Usted cree que el aire contaminado afecta el desempeño académico?

- a. Si
- b. No
- c. Algo
- d. Tal Vez
- e. No Se

12. ¿Qué método de transportación usa su hijo/a para atender a la escuela en una semana regular?

- a. Camina
- b. Su Bicicleta
- c. Por Automovil
- d. Transportacion Publica
- e. Otra: \_\_\_\_\_

13. ¿Es familiar con el Proyecto de Extensions Charcot (Charcot Extension Project)?
- Si
  - No
  - Un Poco
  - No soy familiar
14. Por favor indique a qué grado está de acuerdo con las siguientes declaraciones : *El Proyecto de Extensión Charcot, empeorará los problemas de contaminación del aire en Orchard Elementary y Middle School, y la comunidad alrededor.*
- Muy en acuerdo
  - En acuerdo
  - Neutral
  - En desacuerdo
  - Muy en desacuerdo
  - No se
15. Por favor indique a qué grado está de acuerdo con las siguientes declaraciones : *El Proyecto de Extensión Charcot causará más dificultades para que los estudiantes vayan y atiendan a la escuela.*
- Muy en acuerdo
  - En acuerdo
  - Neutral
  - En desacuerdo
  - Muy en desacuerdo
  - No se
16. Por favor indique a qué grado está de acuerdo con las siguientes declaraciones : *El Proyecto de Extensión Charcot empeorará los problemas de contaminación del aire en áreas donde niños atiende a la escuela.*
- Muy en acuerdo
  - En acuerdo
  - Neutral
  - En desacuerdo
  - Muy en desacuerdo
  - No se
17. ¿Que estrategia de mitigación cree que les provee a los estudiantes con la mayor cantidad de proteccion del Proyecto de Extensión Charcot?
- Un puente para peatones
  - Reemplazar los sistemas de ventilación, aire acondicionado y calentamiento en los salones.
  - Añadir ventanas de doble panel
  - Distribuir mascararas
  - Otra: \_\_\_\_\_
  - No se

18. ¿Cómo compararía el aire de su hogar con el de la escuela Orchard?
- La calidad del aire de la Escuela Orchard es mucho mejor que la de mi hogar.
  - La calidad del aire de la Escuela Orchard es mejor que la de mi hogar.
  - La calidad del aire de la Escuela Orchard es casi igual a la de mi hogar.
  - La calidad del aire de la Escuela Orchard es peor que la de mi hogar.
  - La calidad del aire de la Escuela Orchard es mucho peor que la de mi hogar.
  - No se
19. ¿En una escala del 1 (nada) a 5 (densidad extremadamente alta), que nivel de tráfico hay alrededor del Distrito Escolar Orchard en un día normal?
- 1 (nada de tráfico)
  - 2 (un poco de tráfico)
  - 3 (tráfico normal; ni alto ni bajo)
  - 4 (alto tráfico)
  - 5 (tráfico extremadamente alto)
20. ¿En una escala del 1 (ninguna) a 5 (extremadamente), qué tan preocupado/a esta sobre accidentes de tráfico, cuales involucran peatones, cerca de la Escuela Orchard y el barrio circundante?
- 1 (ninguna preocupación)
  - 2 (un poco preocupado/a)
  - 3 (preocupado/a)
  - 4 (muy preocupado/a)
  - 5 (extremadamente preocupado/a)
21. ¿Cual es la distancia entre su hogar/lugar de residencia y la Escuela Orchard?
- Unas cuantas cuadras
  - En el mismo vecindario
  - Menos de una milla
  - Entre 1-2 millas
  - Entre 2-5 millas
  - Mas de 5 millas
22. ¿Cual es el grado o nivel de escuela más alto que alguien (usted incluido) ha completado en su hogar?
- Ningún nivel completado de escuela
  - Grados 1 – 11; Especifique el grado \_\_\_\_
  - Grado 12
  - Diploma Regular de Preparatoria
  - GED o credencial equivalente
  - Título Universitario de Preparación Básica (por ejemplo AA, AS)
  - Un Bachillerato (por ejemplo: BA, BS)
  - Título de Maestría (por ejemplo: MA, MA, MBA)
  - Título Profesional (por ejemplo: MD, DDS, DVM)

- l. Doctorado (por ejemplo: PhD, EdD)
23. ¿Cuál fue el ingreso estimado total de su hogar del año pasado?
- a. Menos de \$4,999
  - b. \$5,000- 9,999
  - c. \$10,000- 14,999
  - d. \$15,000- 19,999
  - e. \$20,000- 29,999
  - f. \$30,000- 39,999
  - g. \$40,000- 49,999
  - h. \$50,000- 59,999
  - i. \$60,000- 69,999
  - j. \$70,000- 79,999
  - m. \$80,000- 89,999
  - n. \$90,000- 99,999
  - o. \$100,000-200,000
  - p. 200,000 o mas
24. ¿Con qué raza se identifica? (Circle all that are true for you)
- a. Caucasico
  - b. Afroamericano
  - c. Amerindio o Nativo de Alaska
  - d. Indio Asiatico
  - e. Chino
  - f. Filipino
  - g. Otro tipo de Asiático: \_\_\_\_\_
  - h. Japones
  - i. Koreano
  - j. Vietnamesee
  - k. Nativo de Hawaii
  - l. Guamanian o Chamorro
  - m. Samoan
  - n. Otro tipo de Isleño del Pacífico: \_\_\_\_\_
  - o. Otra Raza: \_\_\_\_\_
25. ¿Hay alguna otra cosa que le gustaría añadir sobre el Proyecto de Extensión Charcot?



**Date:** June 7, 2020

**Subject:** In opposition to Item 5.1, the Charcot Ave. Extension Project

Dear Mayor Liccardo, Vice Mayor Jones, and Councilmembers Jimenez, Peralez, Diep, Carrasco, Davis, Esparza, Arenas, Foley and Khamis,

As leaders in the community representing 1800+ South Bay supporters **we are strongly opposed to the Charcot Ave. Extension Project for health, safety, equity, climate and fiscal reasons.** In particular, the concerns raised by BAAQMD (the Bay Area Air Quality Management District) are very troubling and alone are enough reason to discontinue this project. At a time when those of us who are Black and of color are fighting for our lives and for our health, **it's more important than ever to respect the wishes of a community of color by rejecting this project.**

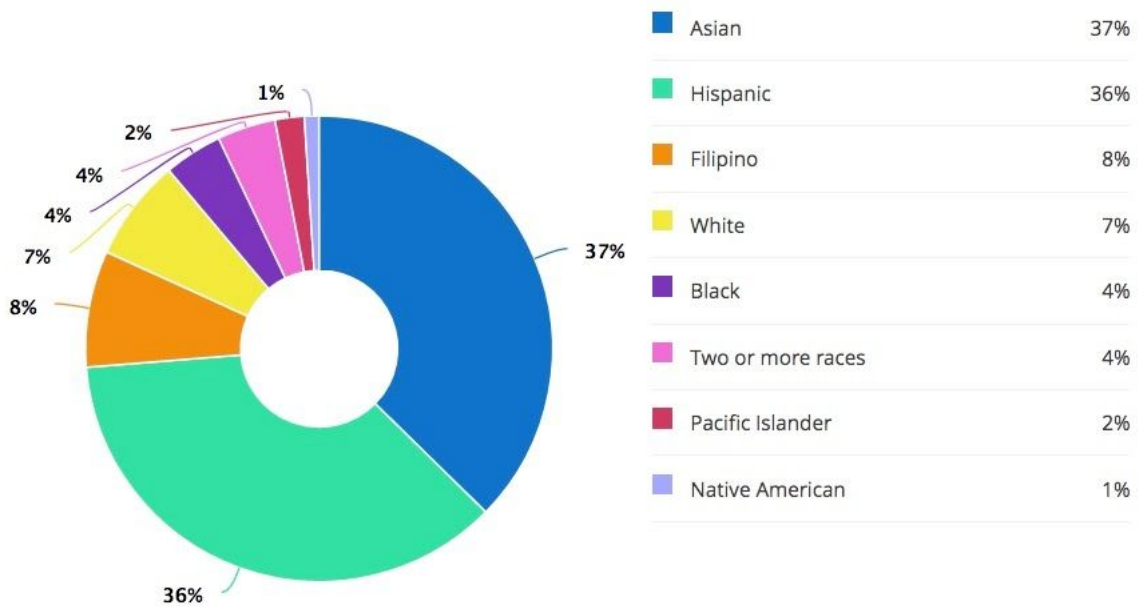
**Health:** By increasing vehicle traffic in the neighborhood, this project will increase air pollution from CO2 and particulate matter. Vehicle exhaust contains numerous poisonous chemicals, including carbon monoxide, sulfur dioxide, nitrogen oxides, formaldehyde, benzene and soot. This project **threatens the health of everyone living in the neighborhood, and especially the Orchard School staff and 850 children**, whose developing lungs are particularly vulnerable to the harmful effects of air pollution, putting them at increased risk for asthma, cancer, COPD and cardiovascular disease. **Children deserve clean air to breathe;** routing even more vehicles next to an established school is not treating their health as a priority.

**Safety:** This project will significantly increase traffic in the neighborhood. Traffic projected to increase 15-fold coupled with cell phone distraction of both drivers and pedestrians of all ages is a recipe for disaster, increasing the likelihood of collisions between vehicles and pedestrians, especially children, threatening their lives. We understand that you are trying to address these concerns, but rather than bringing vehicles into closer proximity to kids, we should be **routing them away from school zones**, just as traffic-calming measures have been implemented at other schools. As Chris Johnson points out in *San José Inside*, "In the U.S., and in California, too, [traffic] is the leading cause of preventable death of people under 40 and the leading cause of death for children." This project is at **direct odds with San José's Vision Zero goals** of zero traffic fatalities.

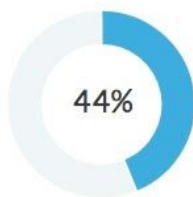
**Climate:** In September of 2019, the San Jose City Council unanimously declared a **Climate Emergency**, recognizing the threat that climate destabilization poses to all of our residents. In

an emergency, we cannot continue business as usual. We must examine the policies that are contributing to the climate crisis and replace them with new policies. The Charcot Avenue Extension Project **undermines the goals of Climate Smart San Jose** and is based on outdated plans and assumptions. It does not fit into the City’s new vision of itself as a vibrant, active, walkable City. Cutting down over 35 mature trees – some of them redwoods 30 inches in diameter and more – near the Coyote Creek side of the project is an irreplaceable loss. These trees **draw down carbon from the atmosphere**, serving as a valuable carbon sink and air purifier. We urgently need to plant new trees not destroy the mature ones we already have. In addition, to be climate-smart, we must stop directing funds to increased highway infrastructure and **instead invest in public transit**.

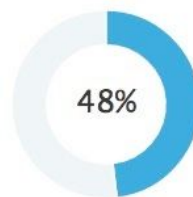
**Equity:** Nearly half of Orchard School students (48%) qualify as low-income, 93% are students of color, and 44% are English-language learners, as shown in the graphics below by Great Schools:



Students learning English ?



Students from low-income families ?



Siting an undesirable, air-polluting and safety-threatening project in a disadvantaged neighborhood raises **questions of environmental racism**, however unintentional. It's vital to consider how this project would divide the neighborhood, disturb residents and students with increased noise, threaten their health and safety, increase pollution, and damage the environment. Furthermore, the project would shrink the school's ballfield and necessitate the relocation of the playground structure, possibly very near the street, diminishing students' quality of life.

We urge the City to consider how polluted the air in the area already is and how the school and the recreational space serve as a refuge for the community. The environmental study done for the City does not adequately consider this reality.

**Fiscally**, spending more than 50 million dollars to increase neighborhood congestion is not a good use of taxpayer money, particularly in light of the severe budget deficit caused by the pandemic. **Most importantly, the harm done to the students, staff and neighbors will be irreparable. The health and safety of the students at Orchard School and the protection of our climate are more important than increasing the speed of cars.**

Therefore, we respectfully request that the City **scrap this misguided and outdated project. It's time to set aside a project that was proposed nearly three decades ago (in 1994, under much different circumstances), and prioritize the health and safety of this community of color as well as our climate smart goals.** A much wiser solution would be a **bike and pedestrian bridge**, which would provide many of the benefits of a road expansion, with none of the negative impacts and at a cost savings. The savings could then be applied to bus operations.

Thank you in advance for listening to and reflecting the wishes of the community.

Sincerely,

1. Linda Hutchins-Knowles, Mothers Out Front South Bay Co-founder, San José resident
2. Hoai-An Truong, Mothers Out Front South Bay, San José resident
3. Stephanie Morris, Mothers Out Front South Bay
4. Erin Salter, San José resident
5. Laura Finnigan-Heil, Mothers Out Front South Bay, San José resident
6. Clémence Tiradon, Orchard parent, San José resident
7. Robin Roemer, Orchard parent, San José resident
8. Kristel Wickham, Mothers Out Front South Bay, Sunnyvale resident
9. Cecile Desquiens, Orchard parent, San Jose resident
10. Loic Weiyuneng, Orchard Parent, San Jose resident
11. Isabelle Chappuis, District4 parent and teacher, San José resident
12. Brenda Y. Rodriguez, District 3, residente de San José
13. Felicia Gershberg, Together We Will - San José, Sunnyvale resident
14. Leena Joseph, parent, District 4 resident
15. Christina Medina District 4 resident
16. Jennifer Lewis, San Jose resident
17. Ed Fernandez, San Jose Resident
18. Brian Haberly, San Jose Resident

19. Carlos Velazquez, San Jose Resident
20. Molly Cox, Sunnyvale Resident
21. John Cordes, Sunnyvale Resident
22. Shannon Loucks, Santa Clara resident
23. Rebecca Habermann, Mothers Out Front South Bay, San Jose Resident
24. Thomas Habermann, San Jose Resident
25. Jennifer Black, San Jose resident
26. Irene Ramos Lerma. Orchard Elementary parent. San Jose resident.
27. Susan Butler-Graham, Mothers Out Front, San Jose resident
28. Justin Gee, Santa Clara Resident
29. Margaret Capetz, Santa Clara Resident
30. Sean McCollough, NVC PTA Council Secretary
31. Rona Berger, Santa Clara Resident
32. Isabella Luong, Santa Clara resident
33. Britta Bullard, San Jose Resident
34. Kris Karnos, San Jose resident.
35. Annette Haines, San Jose resident
36. Rosa Maria Gordillo, San Jose resident
37. Carmen Arjona-Ariza, San Jose resident
38. Susan Lee, San Jose resident
39. Alexander Castro Perezchica, Breathe California of the Bay Area, San José resident
40. Vanessa Talania, Breathe California of the Bay Area, San Jose resident and parent
41. Jennifer Solorio Perez, San Jose Resident & Orchard student parent
42. Julio Solorio-Sanchez, San Jose Resident & Orchard student parent
43. David Lo, San Jose Resident
44. Nagarjun Mudda
45. Diana Chenault, San Jose Resident & Orchard student parent
46. Jennifer Jobart, San Jose Homeowner
47. Charlene Ramirez - San Jose Homeowner & Current Orchard School Parent
48. Monica Mallon, Silicon Valley Youth Climate Action
49. Shiela Talania, San Jose Resident
50. Sandra Gamez, Orchard School Parent
51. Noel Garcia, Orchard School Parent
52. Charmaine Baclig, San Jose Resident
53. Alanbonifacio Molina, San Jose Resident
54. Edna Talania Molina, San Jose Resident
55. Alexandro Carrasco, San Jose Resident
56. Sean Talania, San Jose Resident
57. Loc Tran, San Jose Resident, have 2 young kids attend Orchard Elem.
58. Renée M. Schell, 2nd grade teacher, Orchard Elementary, San Jose resident and voter
59. Billy Sims, San Jose Resident and Orchard School parent
60. Anna Chiang, Breathe California of the Bay Area, Milpitas Resident
61. Kristy Phan, San Jose Resident
62. Annie Belt, San Jose resident
63. Holly Cadena, San Jose resident
64. Marcelina Garcia, Orchard Student Parent



65. Jessica Chavez, Orchard School Alumni ,
66. Stephanie Chavez, Orchard School Alumni
67. Amanda Binz, First Grade Teacher, San Jose Resident and Voter
68. Gavin Binz, San Jose Resident
69. Linda Clark, San Jose Resident/Homeowner
70. Cynthia Ramirez, San Jose Resident
71. Mark Clark, San Jose Resident/Homeowner
72. Medha Gelli, Breathe California of the Bay Area, San José resident
73. Maggie Zhang, Breathe California of the Bay Area, East Bay resident
74. Gargi Sengupta, San Jose resident/homeowner
75. Cassiopeia Jenkins-Schell, San Jose resident
76. Eraldo Marquez, San Jose Resident and Orchard School Parent
77. Rusti Icenogle, San Jose Resident
78. Jesse Orosco, San Jose Resident
79. Fernando Chavez, Orchard Student Parent
80. Michelle Quilantang, Principal of Orchard School, San Jose Resident and Orchard student parent
81. Virginia Varela-Campos, Orchard School Parent and North San Jose Resident
82. Rose Zamaripa, San Jose Resident
83. Noor Heintzelman, Breathe California of the Bay Area
84. María Hennessy, retired bilingual teacher at SJUSD, and San Jose Resident
85. Ha Pham, Orchard School's student parent, North San Jose resident
86. Mark Pham, San Jose Resident
87. Lisa Kobayashi, San Jose Resident
88. Gregory Brisebois, San Jose Resident
89. Kim Nguyen, San Jose Resident and Orchard School Parent
90. Jeannette Forrest, Orchard School teacher and San Jose resident
91. Sucharitha Sirigreddy, parent of Orchard School student and resident of San Jose
92. Barbara Fukumoto, Sunnyvale Cool and Sunnyvale resident
93. Lillian M Guajardo, Speech/Language Pathologist and San Jose resident
94. Fey Camero, San Jose Resident
95. Mary Jane Valiao, San Jose Resident
96. Yoko Fujita, Orchard School Parent and San Jose resident
97. Jennifer Samoranos, Memberships Chairman / VP Orchard PTA, Orchard student parent and San Jose Resident
98. Alan Johnson, Orchard student parent
99. Jessica Solon, San Jose Resident
100. Marsha Dimalanta, San Jose Resident
101. Brandon Samoranos, San Jose Resident
102. Jacqui Dimalanta, San Jose Resident
103. Jennifer Dang, Orchard School Teacher

104. Son Nguyen, Rock Ave, San Jose resident
105. Oanh Tran, San Jose resident
106. Wendy Greenfield, San Jose resident
107. Mimi Tazumi, San Jose Resident and Orchard School Parent
108. Justin Tai, San Jose Resident
109. Annie Vu, San Jose Resident and Orchard Middle School Mom
110. Charles Mendoza, San Jose and Orchard Middle School Parent
111. Braxton Mendoza, Orchard Alumni
112. Luke Nguyen, Orchard School Student
113. Trang Nguyen, Orchard School Mom and San Jose homeowner
114. Duong Nguyen, Proud Orchard Dad/San Jose homeowner
115. Yvette Tran, San Jose Resident
116. Ana Lopez, San Jose Resident and Santa Clara School District Teacher
117. Vivian Duong, San Jose Resident
118. Gladwyn d'Souza, co-Chair, Loma Prieta Chapter, Sierra Club
119. Ragini Srinivasan, San Jose Resident
120. Amiya Peddada, Breathe California of the Bay Area, San Jose Resident
121. Annaloy Nickum, concerned citizen about racism of intended project
122. Thuan Pham, San Jose Resident
123. Sandrine Picot, San Jose Resident
124. Valery Kreidenko, San Jose resident, dad of 2 kids in Orchard Elementary
125. Paul U, San Jose resident, dad of 2 kids
126. Matt Wee, San Jose resident, dad of 2 kids in Orchard Elementary
127. Halina Gallagher, San Jose Resident
128. Lynn Limqueco, San Jose Resident
129. Judy Young, San Jose Resident
130. Mimi Michelle Spreadbury, San Jose Resident, Orchard City Indivisible- Campbell
131. Antonio Dimalanta, concerned citizen, raised in San Jose
132. Heidi Boverman, San Jose resident
133. Karina Knowles, San Jose resident & youth
134. Vivienne Dimalanta, San Jose resident
135. Perla Dimalanta Zeijnali, San Jose resident
136. Virginia R. Dimalanta, San Jose resident
137. Marilou Mutuc, San Jose resident
138. Purva Bhattacharjee, San Jose Resident
139. Donna Zapico, San Jose Resident
140. Crystal Hernandez, San Jose Resident
141. Marissa Tayag, San Jose Resident
142. Jennifer Lor, San Jose Resident
143. Lila Catli, San Jose Resident
144. Desie Mehrabian, San Jose Resident

145. Stacy Levy, Mothers Out Front Member and San Jose Resident
146. Chass Peppers, San Jose Resident
147. Karina Brouse, San Jose Resident
148. Dave Poeschel, San Jose Resident
149. Anika Knowles, San José resident & youth
150. Audrey Rust, San Jose resident
151. Michael Kutilek, San Jose resident
152. Philippe Levy, San Jose Resident
153. Diane Bailey, Menlo Spark
154. Stephanie Snow, Mothers Out Front South Bay
155. Brian Hutchins-Knowles, Mothers (& Fathers) Out Front South Bay

June 8, 2020

Children's Garden Preschool  
1328 Rothland Ct  
San Jose, CA 95131

**Subject: In opposition to Item 5.1, Charcot Ave. Extension Project**

Dear Mayor Liccardo, Vice Mayor Jones, and Councilmembers Jimenez, Peralez, Diep, Carrasco, Davis, Esparza, Arenas, Foley and Khamis,

As a childcare provider in the vicinity of Orchard School, I have served innumerable families and their children of this area for eleven years. In my experience, these were mostly recent immigrants with great language barriers. They were still learning the basics of our society. They were still unaware of many rights and opportunities for their children that the Bay Area has to offer. I often served not only as a childcare provider, but almost as a social worker: to connect them to the right agencies, speak to special education teachers, providing resources to enroll them in school in time, etc.

On behalf of the families who have come through my preschool, the community of Orchard School, the neighborhood and future students, I am using my voice today to speak for those who can't speak for themselves. **I am strongly opposed to the Charcot Ave Extension Project.** Children have the right to clean air, large open spaces, safe schools and playgrounds, away from big traffic arteries. By dropping this project, and building just the pedestrian and bicycle overpass, you have the chance to show these children and their families where your priorities are. That they are valued as equally important as other school communities in San José. I hope you will do the right thing.

With gratitude to you for listening,

Isabelle Chappuis  
San José resident, District 4  
Children's Garden Preschool, Owner and teacher  
Mother of two teenage daughters  
Volunteer with Mothers Out Front South Bay