



BREATHEFRESNO

andrew valles | studio stannard | spring 2017

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PREFACE







THE BEST LITTLE CITY IN THE USA...

I grew up in this city. I knew it wasn't perfect when I was a kid, and there were always things I hated about the city. "Fresno is too boring" or "It's too hot" were minor complaints I had. I also remember not being allowed to play outside in elementary school some days; I assumed it was normal. As I grew older, the issues started to make more sense.

When I was a cross country runner in high school I was always relieved when practice was canceled due to bad air. Everyone on the team could feel it. Whenever there was a wildfire in the mountains, you could smell it, taste it and see it. If it was really bad, it looked like it was snowing a light ash. It was only this extreme a few times a year but in general the air didn't bother me on a daily basis. I know many other people that struggled much more due to their allergies and asthma so I was grateful that I didn't. I realized that Fresno had huge issues and wondered why you would live here if you weren't a farmer. There was a lot of poverty apparent every time I went downtown, with Fresno being notorious for having little "tent cities." The crime rate is higher than average with it being one of the automotive theft capitals of the nation, not to mention the huge drug abuse problem that Fresno has with meth. That's why when I was applying to college many students, including myself, were hoping to leave the sinking ship of Fresno before things got worse.

After I left for college I felt like I made the right decision, giving myself more opportunities to succeed. My friends and family supported it so I felt good about my decision. Every time I would come home during winter and summer break, however, I felt like I missed Fresno. Even after all the badmouthing of Fresno I did as a teen and even now, it was still always going to be my hometown. It was then when I realized that I wanted to be in Fresno, just not under the current conditions. It isn't fair so many people that are stuck in Fresno because of poverty have to deal with all these issues. These people shouldn't have to move, they should want to stay. They should have good jobs, breathe clean air, and enjoy their lives.

Even though this dialogue starts up a bigger conversation of saving Fresno, I think the air quality issue is where we should start. My dad has asthma, my sister and brother have severe allergies, and a couple of my friends also have breathing problems. There are thousand of other people in Fresno that have the same issues. The city of Fresno just isn't that livable. The "best little city in the USA" isn't little any more and it needs to grow up and take a greater responsibility for cleaning the air for the people living there.

FRESNO

Fresno is a important city in California and in the nation but is often assumed to be just a small city. It is home to one of the leading agricultural industries in the nation producing around half of the nations fruits and vegetables. The city, however, perhaps is overlooked due to many serious issues such as air pollution. It currently ranks 3rd in the nation for air quality and is consistently in the top of these charts, ranked even first sometimes. It is a complex issue attributed to not only smog from cars but pollution from the agricultural industry. The city is also high in poverty, being the only national ranked city with high densities of poverty in the state, at around 27 percent. The problems are only made more severe with the geographic location of the city, right in the middle of the Central Valley, trapping the contaminates in a geographic "bowl".

The residents of Fresno already have problems breathing. Asthma and other respiratory problems prevalent here. 1 in 5 children have childhood asthma in the city and most patients carry on the disease to adulthood. Public health should be a priority and cutting down on air pollution is a solution. The city hasn't slept on the

issues however. In fact, the city has been actively making changes. 2015 was Fresno's cleanest year since the city began recording particulate matter. However, there is still work to be done.

The future built environment of Fresno should have solutions for air pollution issues. Buildings should be a model for clean energy, clean transportation, and healthy living. There may be the potential for creative architectural solutions to help mitigate air quality challenges. Proposing a youth center that serves as a building model for clean air solutions will give kids place to learn about the importance of air quality as well as a place for refuge. This may also help bridge the gap between the poor and the rich of Fresno, showing that architectural solutions are not only an amenity for the rich, but fundamental tools that can improve everyones lives. Through architecture, solutions will be explored to help fight air pollution, promote healthy and eco-friendly lifestyles, and unite the city. It will most importantly improve the city for the next generation to live and prosper in the future.



PROPOSAL

Fresno has a continuing problem with air pollution leading to serious environmental and health issues. The efforts to improve pollution have not been as effective as hoped and with population growth, the problem is getting worse. Through innovative building methods and materials as well as a strategic landscape intervention, a small master plan project in the underprivileged neighborhood of West Fresno envisions a clean future with architectural screens and landscape elements acting as air filtration devices. This plan will include a library, community center, maker space and an interactive landscape which will serve to educate residents about health and environmental issues. The project aims to act as a catalyst, to not only demonstrate a localized response to environmental challenges but also to ignite broader environmental changes throughout the city.



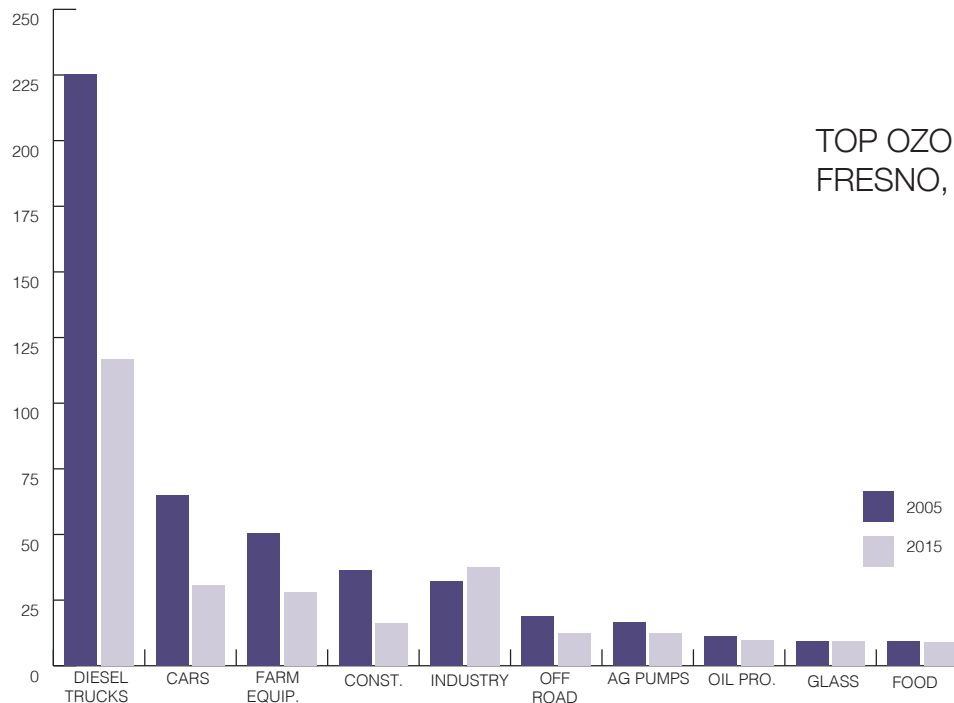
ENVIRONMENTAL ISSUES

AIR QUALITY

The air quality in Fresno and the San Joaquin Valley in general is very poor. It is currently ranked nationally as the third worst air quality in the nation. The causes of the pollution are complex. Most experts agree that the combustion engine is still the main problem contributing to bad air in the area. The heavy duty diesel truck is the top pollutant and light passenger cars are right below it. The diesel emissions are high because the Valley is a huge transportation corridor. Thousands of big rigs drive on Highway 99 everyday and they accompanied by even more passenger cars, driving everyday an average of 20 minutes to get to work and other errands.

TOP 5 POLLUTANTS

1. HEAVY DUTY DIESEL TRUCK
2. LIGHT DUTY PASSENGER CAR
3. FARM EQUIPMENT (TRACTORS)
4. OFF-ROAD EQUIPMENT (CONSTRUCTION)
5. MANUFACTURING AND INDUSTRIAL

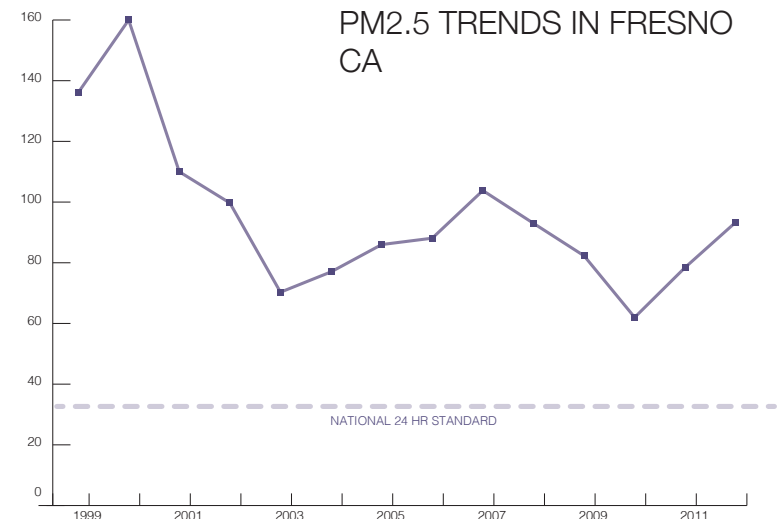
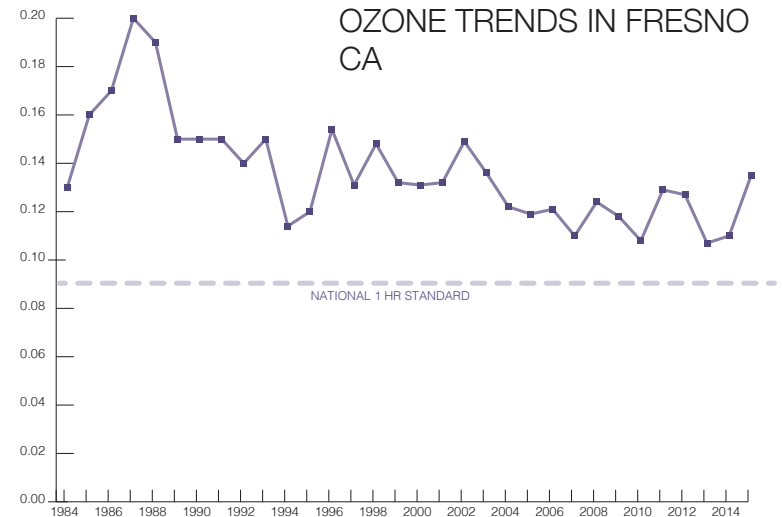


TOP OZONE POLLUTANTS IN
FRESNO, CA

Fresno and the rest of the valley cities suffer from urban sprawl, an issue to consider if we wanted to make a true impact. However, another source that is a bit harder to find data on was the impact of dairy farms. Waste and gases from cows are very potent and due huge damage to the ozone. Dairy farms are on the rise in the Valley too raising concerns from many experts. This source could rival vehicle pollution in the future so further action will need to be taken on this issue. Particulate matter is also very high in Fresno because of diesel engines, dust, construction, and wood burning. Hot summers and foggy winters make particulate matter a bigger issue in Fresno.

If we examine the graphs to the side, you will see that Fresno has actually never achieved clean air as defined by the EPA national standards. The graph has a spike in contamination in the 1980s because Fresno experienced very rapid growth during this time. It is also to be noted that the graph has a lot of up and downs. This is due weather. Weather can always contribute to making pollution better or worse and it is something that we can't really control. In general, the graphs do show a trend of improving air quality over time.

However, the reasons are not something that we should get too excited about. Major cuts to vehicle emissions were the cause for the drop in pollution but they were only achieved because cars and technology are improving, not because the air boards policies are working. The number of cars haven't been reduced; in fact they have increased, with a higher number of miles driven per capita. Fresno and the Valley are in a constant fight with the EPA because of their failure to reach the federal standards for clean air. The local air board has to be much more aggressive if they want to get the EPA off their backs. Banning wood burning and smog checks for all cars are not going to be a sustainable solution for the area. They have underestimated the scope of the problem in just about all aspects. Until significant changes occur, Fresno County and the rest of the Valley will continue to be fined by EPA and more importantly keep on breathing bad air.



ENVIRONMENTAL ISSUES

THE “BOWL” EFFECT

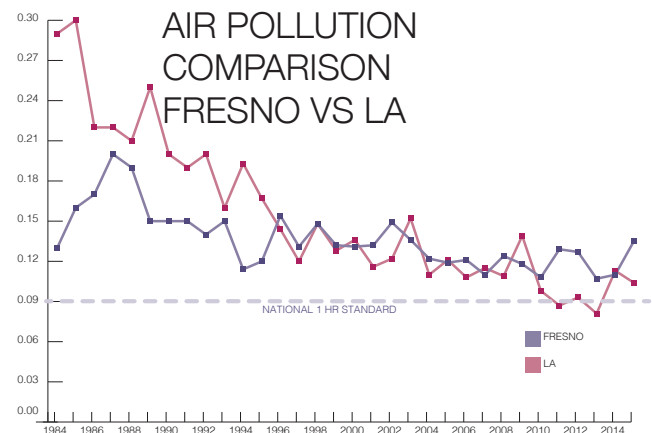
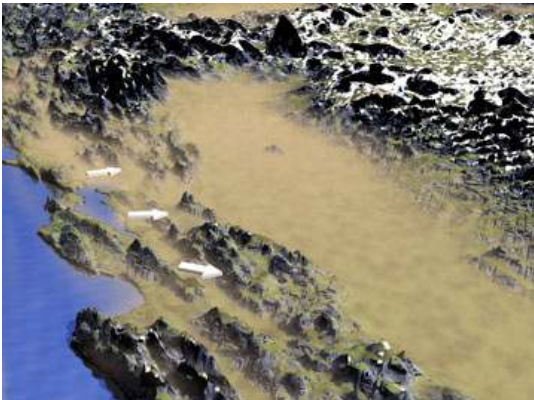
There are more factors working against clean air in the Valley, and the problem lies in the location its self. The mountains around the San Joaquin Valley tends to trap the pollutants in. It is especially bad when you mix in the hot summers and the dense layer of fog the area experiences in winter.

The “inversion layer” occurs when cool air is trapped under a layer of warm air, leaving a stagnant air flow. The inversion layer not only traps air but smog, which keeps it close to the earth making air quality worse. The Northeast winds also blow in dirty air from the Bay Area and even from China. As much as 11 percent of air pollution in Fresno comes from the Bay Area and even China which leave the residents of the area carrying the burden. Similar effects are seen in cities like Santiago, Lima and Mexico City, all of which have made improvements to their air quality even while battling geographical location.

This is why many experts say that the Valley has a lower carrying capacity for people and we may have already exceeded the capacity. For example, Los Angeles and Fresno are two California

cites that are constantly at the top of the charts when it comes to bad air quality. They have similar pollutants, mostly due to transportation and industry. The one fundamental difference? Los Angeles county is home to over 10 million residents while Fresno county is just shy of one million people. In fact, Los Angeles has in some cases out performed Fresno in its battle against air pollution despite having to deal with many more people.

The San Joaquin Valley is growing to. Fresno has grown 4.6 percent since 2010 and many other valley cities are growing as well. Fresno's adjacent city, Clovis, has grown at nearly double that rate at 8.4 percent. This is why experts are most concerned about this issue. The city can grow but at the moment it is falling for the same reasons that Los Angeles did decades ago. Los Angeles continues to improve despite its massive population, but the Central Valley simply cannot sustain clean air with the estimated 6.4 million residents by 2040 with everyone driving their car. The San Joaquin Valley is really the highest risk location in the nation for smog and ozone problems to occur.



HEALTH EFFECTS

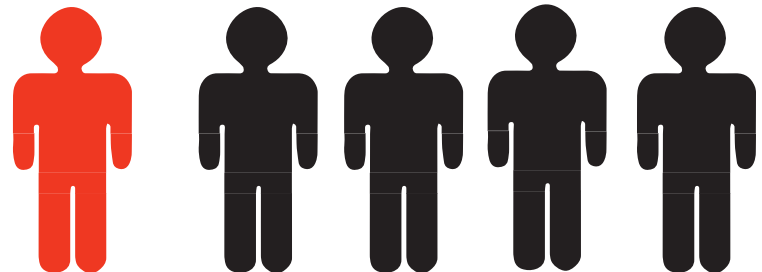
The unhealthy air quality is a reason for residents to be concerned. Fresno has very high asthma rates, and it actually leads the nation with the highest childhood asthma rate, with one in five children developing the disease. This leaves children, asthmatics, and the elderly very vulnerable to the menacing air in Fresno. Ozone pollution also is linked to developmental challenges in children, reproductive problems, susceptibility to infections and premature death. Particulate matter, is especially harmful, with experts arguing it is worse for your lungs than ozone. These not only lead to breathing complications but have been linked to higher rates of cancer, cardiac problems, other respiratory problems, and even higher rates of death. Lung disease related deaths related to air pollution are second only behind cigarette smoking. It is a grim outlook for people in Valley.

People have to visit doctors more often due to their respiratory problem. Fresno Unified School District says the main reason that students have excused absences is to go to the doctor. It also costs Valley residents billions of dollars with frequent hospital visits due to their breathing. It is said as much as 1.7 billion dollars in

Fresno are spent on medical issues related to air pollution and 6 billion is spent in the entire San Joaquin Valley. The people most at risk are the farmers of the area. They deal with dust, pesticides, and soot from burning making their intake of particulate mater higher than regular residents.

Fresno is possibly the worst place to live in the US for health reasons alone. While Fresno may not have China levels of pollution, where you need a mask to go outside and people try to stay inside altogether, the fact that one could develop lung cancer with out ever smoking a cigarette in their life is just unfair. We don't want Fresno to get to these levels because these levels of pollution are already totally unacceptable. Is it fair that kids are restricted from playing outside during their recess in school because the air is bad on some days? Is it fair that Fresno makes much of food for the rest of the state and the country but it carries the burden of bad air? As long as nothing is done on the issue the only victims that matter are the people of Fresno and the rest of the San Joaquin Valley who pay the price of the poor air quality with all of these health risk

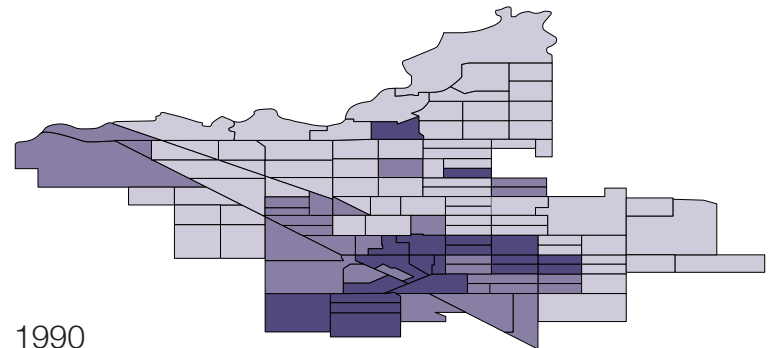
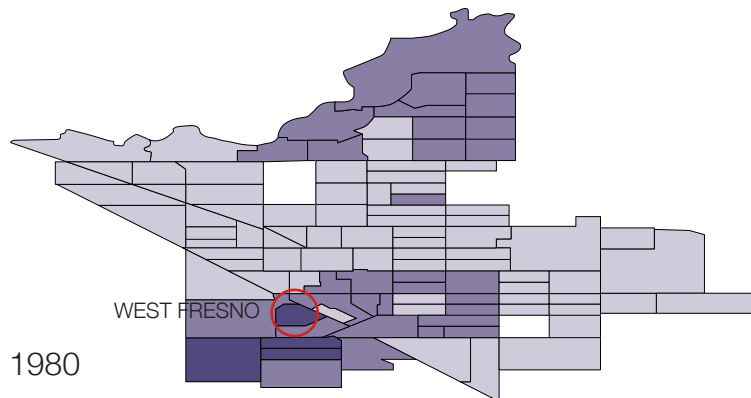
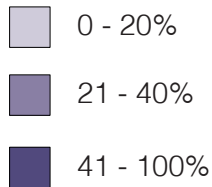
ONE IN FIVE CHILDREN DEVELOP ASTHMA
IN FRESNO



SOCIAL ISSUES

Fresno is a city also struggling with widespread poverty. The city is one of the cities hardest hit by the recent Recession, causing even more poverty. However, the issue of poverty in Fresno is a recent issue but a chronic issue.

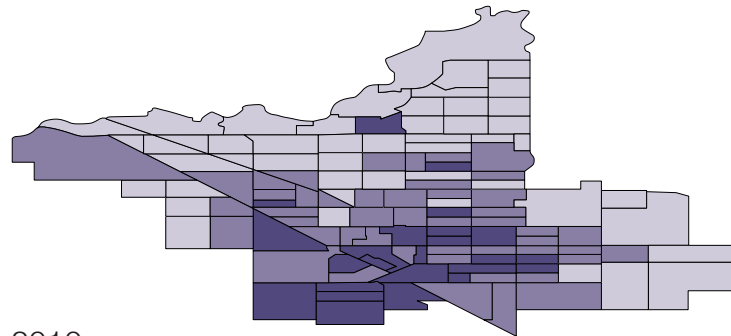
PERCENTAGE OF FRESNO RESIDENTS LIVING IN POVERTY



Fresno has a dark history regarding poverty. To begin, racial segregation is largely to blame when the city was being developed in the 1940's. When the city began to grow, landlords could choose not to house people of color or other non whites. This left all minorities in Fresno to live in substandard housing because it was all they could get. It also setup a bridge between the rich and the poor. In the maps below we see how the West side of Fresno had already been affected for reasons mentioned above. By 1980 the city had already been divided and continued to grow that way. The city would stay divided, the poor and mostly minorities would live in South West Fresno while the rich and mostly white population would move North to the newer and better house. The division of North and South Fresno continued to grow through the mid 2000s, leaving even historic parts of Fresno like downtown and the Tower District, in poverty and abandoned because people just didn't feel safe. Downtown is really now a ghost-town and has been that way for decades now.

However when the Recession hit, the racial division didn't matter as much. In 2010, the unemployment rate in Fresno rose to 19.8 percent, nearly double the national rate. It also had very high foreclosure rate at the time making the city a hard place to live. The poverty grew in just about every part of the city except the far north, the newest part of town. Fresno now has about 31 percent of its residents living in poverty, making it the California city with highest poverty rate and is actually ranked 7th highest poverty rate in the nation.

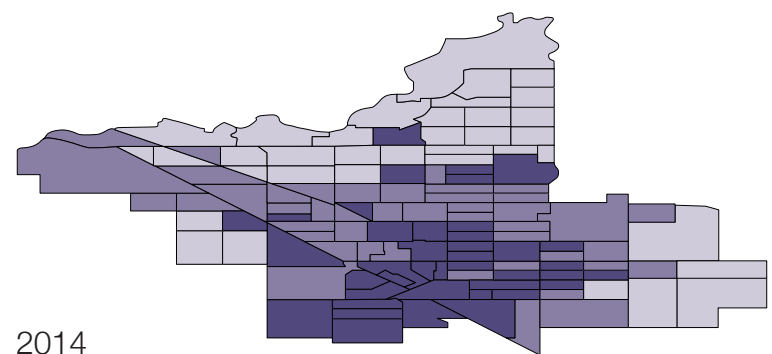
With higher poverty rates, many other trends tend to follow. Fresno's residents are not very educated, with around 25 percent of residents failing to get a high school diploma. Crime also is a trend that follows poverty, with Fresno not being an exception. Violent crime per is a rate 1.5 people per 100,000, higher than both California and national averages. The way Fresno seem to deal with the problem is by urban sprawl. When the once good part of town inevitably become overrun by the problems of poverty, the rich that have the freedom to move go north or to Clovis, the town adjacent to Fresno.



2010

The city is also very dependent on the agriculture economy. The problem with this type of economy is notorious for its low paying wages. If you are a farm owner, you can make millions; if you are farm a worker you make very little. There isn't much job diversity in Fresno which means i the agriculture business is doing poorly, the entire economy also suffers.

Business has also been struggling but not because of the Recession, but because of the drought. Farmers face major challenges with water shortages. The agriculture business has been growing and increasing their profits. In 2014 profits hit the record high of 7 billion dollars decreasing in 2015. However, assuming the Recession and the drought never happened, unemployment would still be higher in Fresno because of it lack of economic diversity. Fresno has always lacked economic diversity and this is perhaps the main reason why the unemployment rate has stayed above average in Fresno.



2014

SOCIAL ISSUES

Despite all the bad news, experts still have hope for real solutions in Fresno. They believe that the population needs to be educated, and a robust system needs to be in place emphasizing a great public school system and to job training so it is more inclusive. Transportation is also a means of helping the population because if they don't need a car that is more money saved, not to mention the reduction in emissions.

Most importantly the wide income and social gaps that have been formed in the city need to be healed; people lack empathy on the issue and needs more discussion from community. What does poverty mean for Fresno and the fight against air pollution? The city's most vital business, agriculture, is affected negatively by air pollution. Bad air actually reduces crop yield in the Valley by as much as 20 percent. Better air also would make the city a more attractive place to live, with other businesses more willing to move operations to Fresno. There are many economic factors that makes lots of sense to fix the air pollution problem in Fresno. However, there could be

barriers to getting the message across to the population. The lack of progress from the air board already shows this.

Most of the population probably does care about their health and clean air, but if it isn't cheap it won't be attractive because quite frankly, most people are just trying to get by. As horrible as it sounds, this is a reality for many people which means that fixing the problem will require innovative and affordable solutions. Fresno cannot expect everyone to add solar panels in their house even though it is one of the cities best suited for them. They cannot expect citizens to upgrade their current car to a hybrid or electric, nor can they expect them to drive less without improvements in public transportation. Education will also have to play a huge role in the reduction of the poverty in the city and in the improvement of the air quality. Understanding that poverty may be a contributing cause the pollution problem in Fresno, it may be worth assessing fixing problems from the ground up to get a sustainable solution both socially as well as ecologically.

NATIONAL UNEMPLOYMENT RATE 5.1%

STATE RATE 5.9%

FRESNO RATE 10.1%

2016 US Bureau of Labor
Statistics



CONTEXT + SITE





HISTORY

Fresno, meaning “ash tree” in Spanish is how this once small railroad town got its start. Spanish settlers named it this because the area was filled with this tree, but never developed the town. Since its inception, the town has grown and changed immensely with the town being the fifth largest city in California and an agricultural powerhouse.

Before the Spanish ever even got here, the Yokuts tribe called the area its home and even some Chumash people were in the Valley. After the California gold rush, Fresno county was founded in 1856 and the growth continued thereafter when the railroad companies came in 1872. The city was very much a old western town because of this. Fresno became an incorporated city in 1885 when irrigation and agriculture became a big draw. The main crop at this time would be grapes and “raisins” because of the huge empire Francis Eisen would create. It would later grown to the agriculture hub we know today.

The city continued a quick rise in population and become a big thriving city by the 1930s. The decline of the city would come until the 1970s, when developers began to build further north and essentially sprawl everything out. The downtown area would see a decline business which also meant an increase in crime in that area. This also goes into the social divide of Fresno in which the poverty in the city tends to be in the south and downtown regions whereas the wealthy tend to be in the northern part of the city. Despite this decline and high unemployment in the city, Fresno keeps growing which a trend that seem to only be happening in California for some reason. Fresno is still an important and overlooked city with a rich history. The downward trend is something more recent that has occurred only in the past 40 years.





TIMELINE

1872

Fresno founded by Central Pacific Railroad Company



1877: Irrigation introduced to area Francis Eisen begins production of raisins in Fresno. Birth of agriculture industry in the city

1885: Fresno becomes an incorporated city. Population 1,500

1904: Gottchalks opens for business. Armenian refugees come to Fresno before genocide. Population 12,000

1890: City begins to take shape, grows tremendously. Population 10,000



1954: Fresno philharmonic founded. Population 92,000

1966: Fresno convention center built. United Farm workers, lead by Cesar Chavez protest to Sacramento.

1975: California Air Pollution Control district created.

1964: Fulton Mall opens in downtown Fresno. Population 134,000

1970: EPA founded and Clean Air act passed. Fashion Fair Mall opens. Population 165,000

1911: Fresno State founded.
Population 25,000



1922: Fresno Bee begins
publication. Population 45,000



1935: Fresno opens first modern
landfill in US. Population 52,000

1942: Japanese -American
internment camps used in
Fresno. Population 60,000



1980: Fresno becomes the fastest growing
city in US. Air pollution spikes to record
highs. Population 217,000

2002: Grizzlies Stadium opens
downtown. New particulate
matter standards adopted.
Population 428,000

2008: State allocates fund to clean up 80
percent of Central Valley smog

PRESENT

1992: State adopts cleaner gasoline
standards. Population 354,000

2015: Fresno declares worst drought in
history. Population 520,000

DEMOGRAPHICS

Fresno has become quite the diverse place in recent years. While it is still predominately a Hispanic community, there is a rich blend of over 70 ethnicities in Fresno. The city went from being a predominantly White community to shifting to be majority Hispanic. The makeup of the race is heavily Mexican but has sizable Central American and Puerto Rican population. Most of the White makeup has German ancestry but notable ethnic groups include the Armenian population, who came to Fresno for refuge from the genocide. The Asian makeup is also very diverse, with the Hmong population being the biggest but many other communities such as Indian, Vietnamese, Chinese, and Filipino having large communities as well.

The immigrant population is very high in Fresno, due to the farm community. The foreign born population is 105,00 people, about a fifth of the city. This means that many adults don't speak English very well and have lower education. Median household income in Fresno is \$39,880, well below the state and national averages but is not too surprising given the poverty issues in the city.

The city needs to provide spaces for these diverse communities to celebrate their cultures and take into account the various differences that they have from each other. The city already celebrates the diversity but the spaces we provide architecturally must make sure we preserve it.



HISPANIC

- Mexican
- Central American
- Puerto Rican
- Cuban
- South American
- Spanish

WHITE

- German
- English
- Irish
- Portuguese
- Armenian

ASIAN

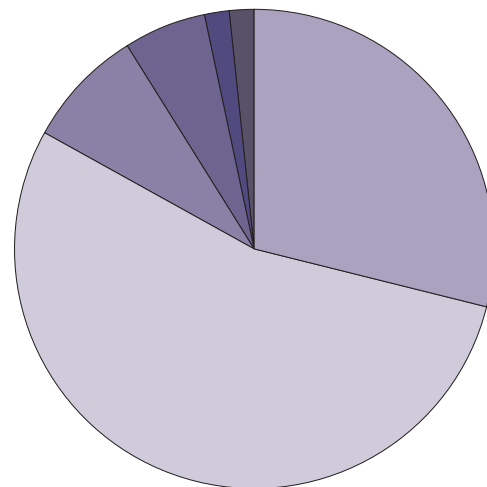
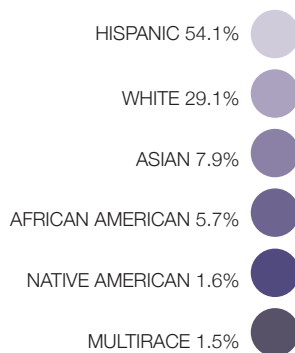
- Hmong
- Indian
- Filipino
- Laotian
- Thai
- Cambodian
- Chinese
- Japanese
- Vietnamese
- Korean
- Pacific Islander

AFRICAN AMERICAN

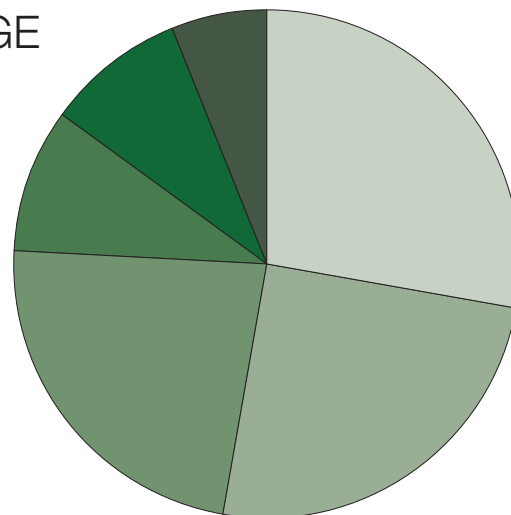
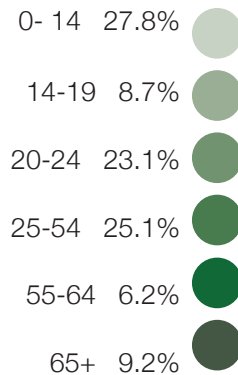
NATIVE AMERICAN

MULTIRACE

RACE

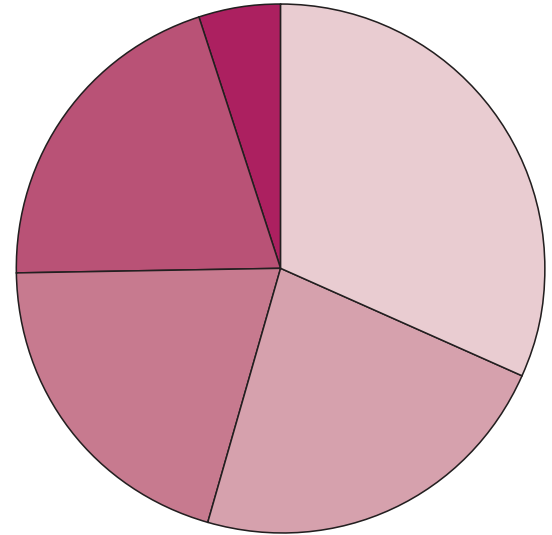
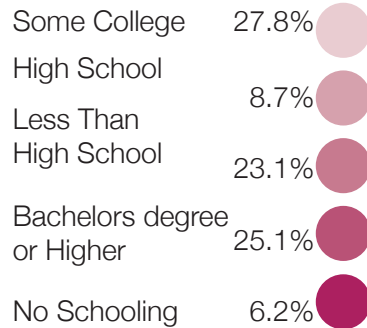


AGE



DEMOGRAPHICS

EDUCATION



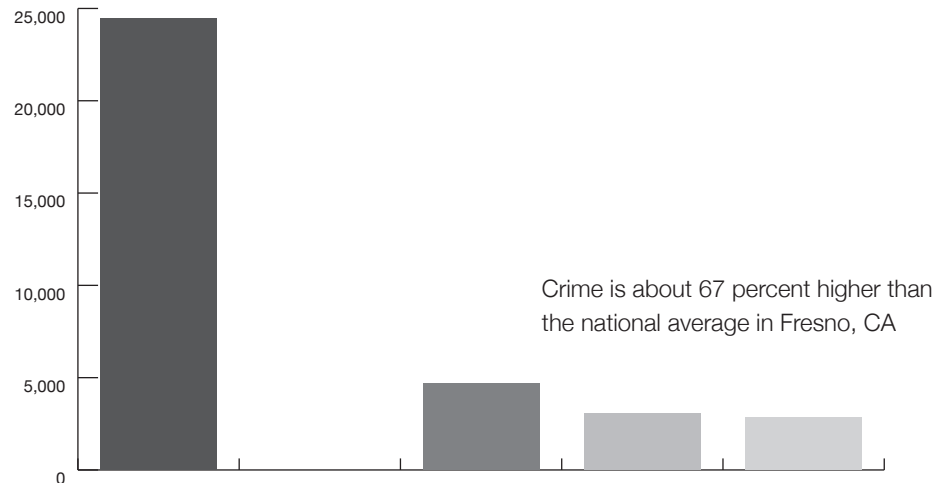
CRIME RATES

Total Crime: 24,477 incidents

Fresno:
4,700 crimes /100,000 people

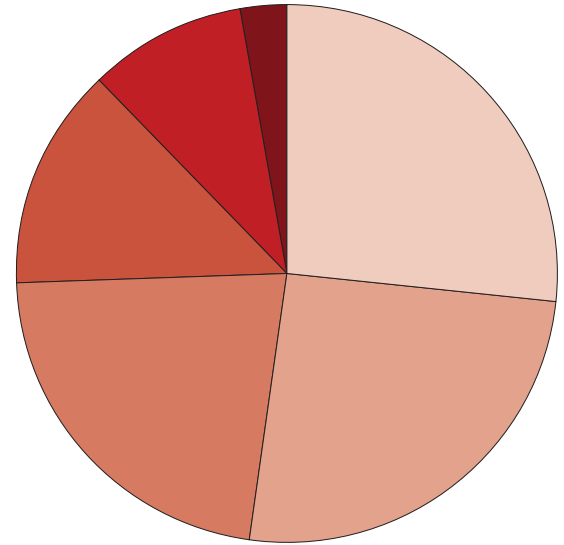
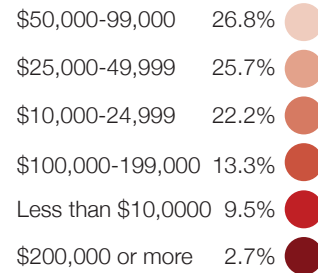
CA:
3,045 crimes /100,000 people

USA:
2,860 crimes /100,000 people

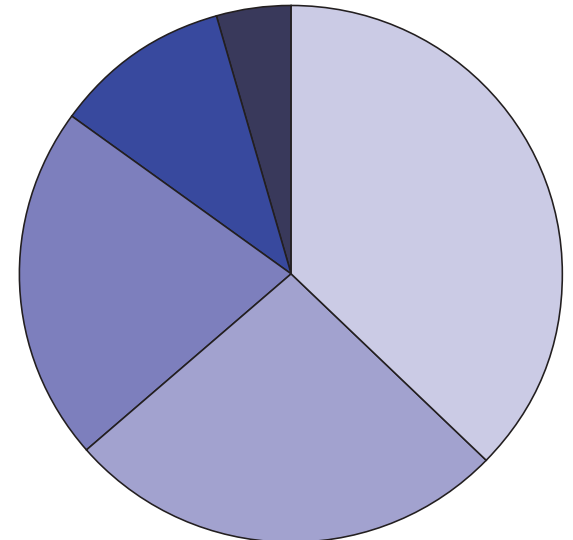
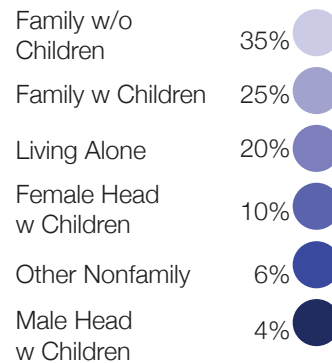


HOUSEHOLD INCOME

MEDIAN INCOME:
\$39,880



HOUSEHOLD ARRANGEMENTS

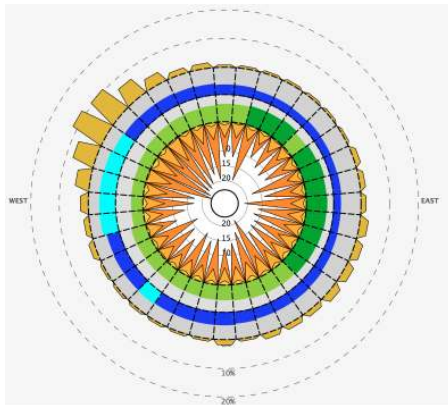
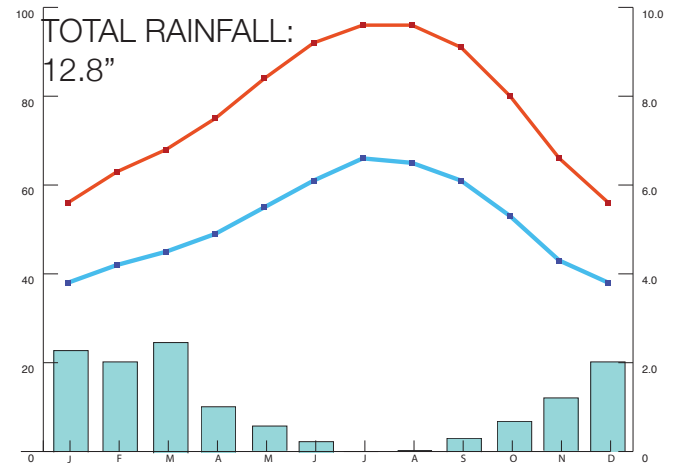
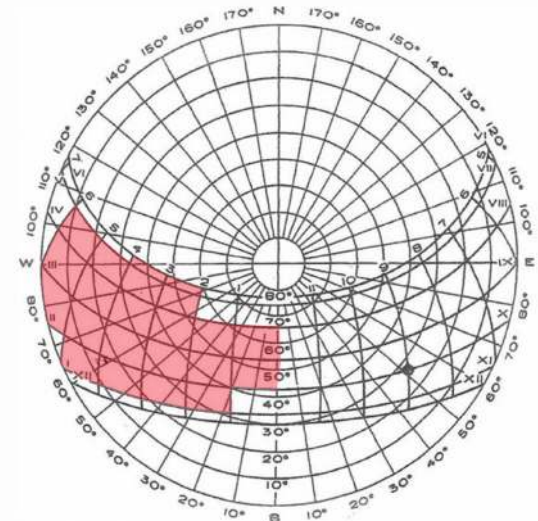


CLIMATE

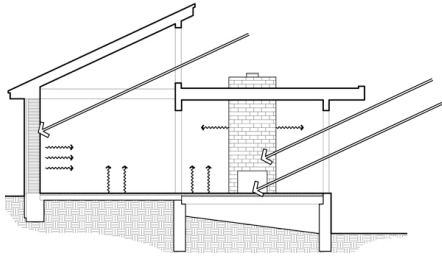
The climate in Fresno is defined by very hot and dry summers and a cold and wet winter. It is classified as semi arid but it shows some aspects of Mediterranean climate. The temperatures can soar to well over 100 degrees Fahrenheit in the summer, with cooling in the summer a very high priority. Even though Fresno seems to have more days out of the comfort zone in the summer it is actually more uncomfortable in the winter. The under-heated period is a concern because Fresno can actually get below freezing on a cold winter night.

Rainfall in Fresno has always been pretty low but the current drought put the city in extreme need of more precipitation. Agriculture depends on precipitation of the in city and in the Sierras, which are both very below average. There are 271 sunny days a year in Fresno, making it the 7th sunniest city in the nation and a rather comfortable place to live despite the temperature contrast in the seasons. This also makes Fresno a prime location for solar panels.

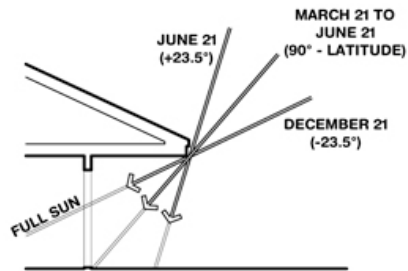
This climate is difficult but not impossible to make a good passive building. It is going to be crucial to find a balance of shading in the summer yet direct gain for the winter because the differences are so big. In the end, 30 percent of the days will require a heater despite all of the summer cooling and most of the winter passively comfortable.



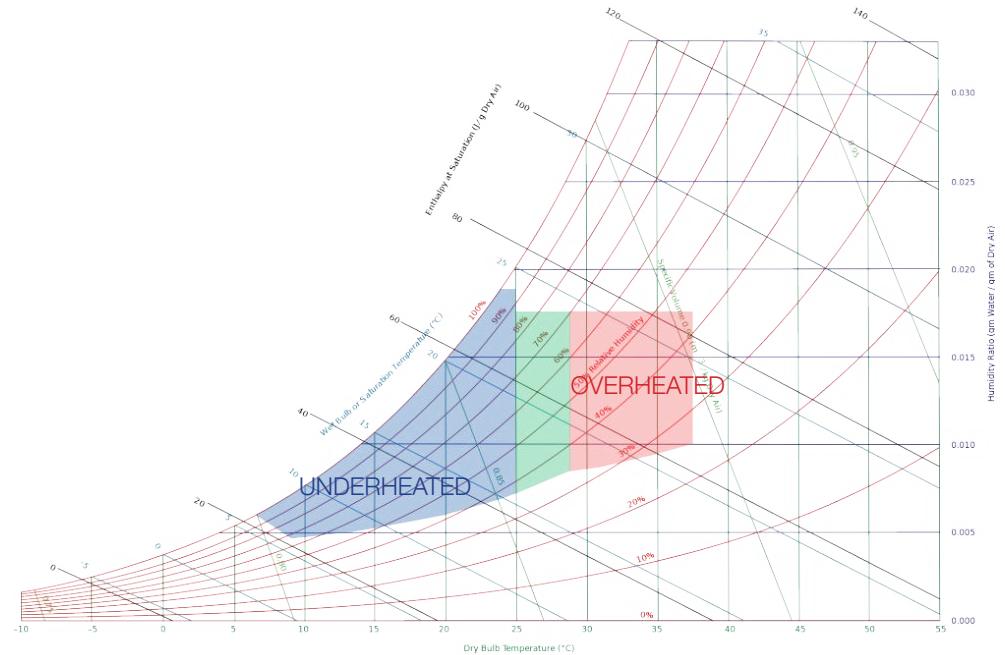
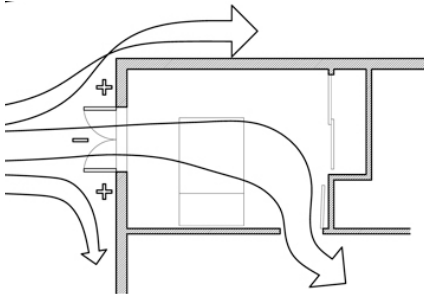
THERMAL MASS



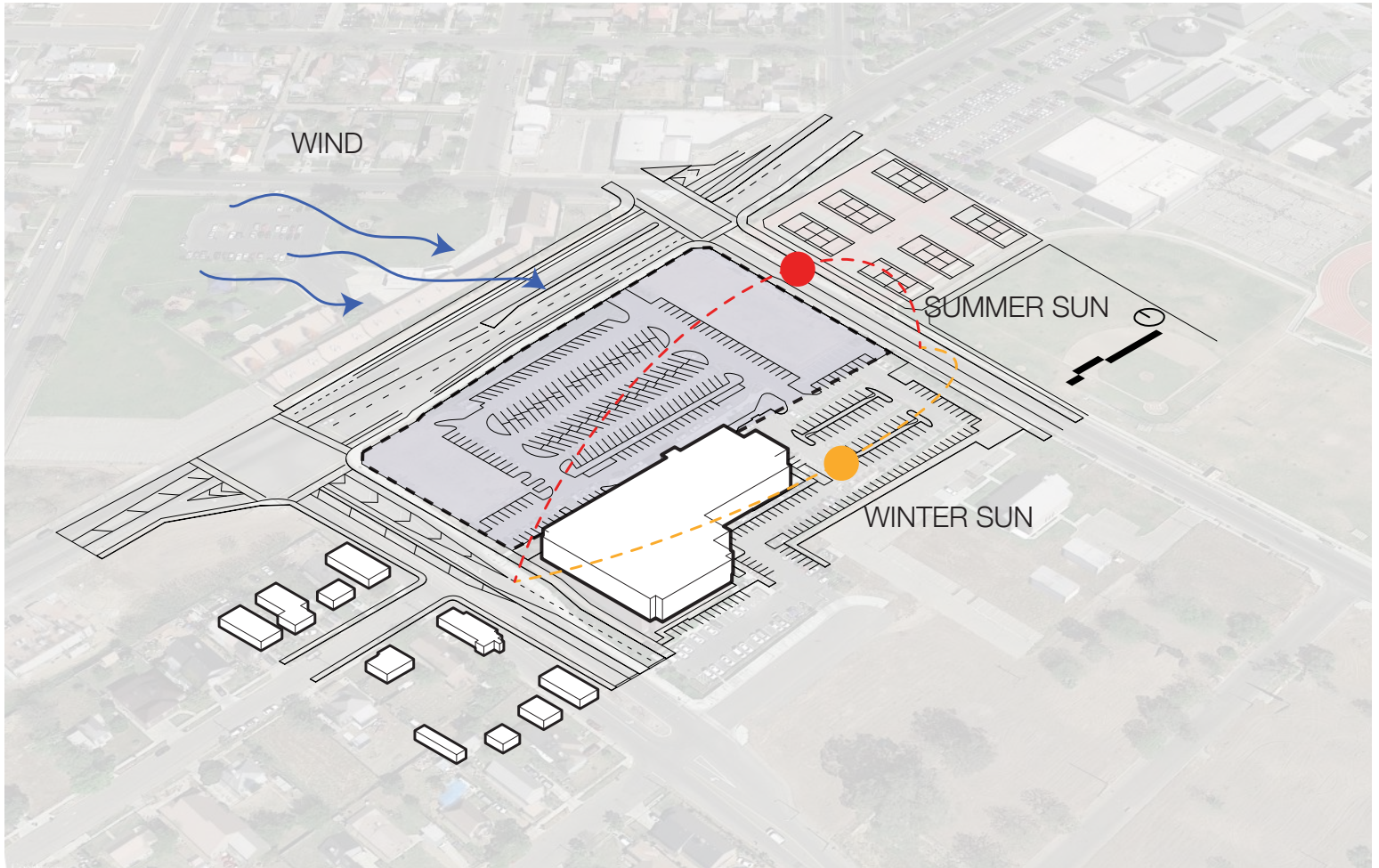
SHADING



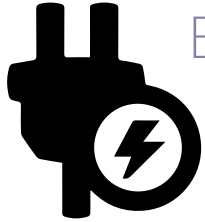
PASSIVE VENTILATION



SITE ANALYSIS



ENERGY AND WASTE



EUI TARGET

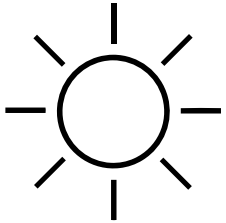
25.9

(kBTU/ Sq. Ft)

SOURCE ENERGY
USE

3,600,600

(kBTU)



SOLAR GENERATION

1,125,000

(kWh/year)
*3,838,500 kBTU/year



ZERO NET ENERGY
BUILDING



2,333

ELECTRIC VEHICLES
CHARGED ANNUALLY

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Energy & Daylight

Upload to Sefaira

Close Daylighting Visualization

Entity Palette

Check Entities

Analysis

Update Analysis

School in Fresno, CA, USA

Properties

Total Floor Area 41,480 ft²

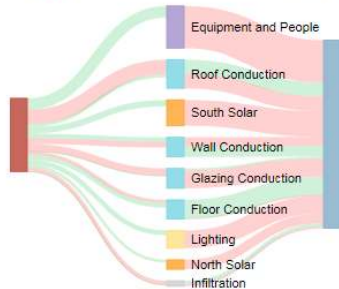


Gains & Losses

Guidance

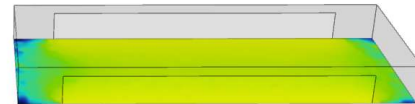
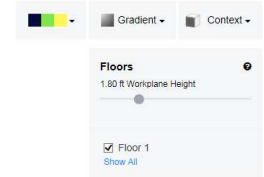
Impact on Heating

Impact on Cooling



☒ Include active gains and losses

Daylighting Visualization



Percentage of occupied hours where illuminance is at least 37 footcandles, measured at 1.80 feet above the floor plate.

0% 25% 50% 75% 100%

The initial climate modeling of the building was a simple narrow rectangular form with windows facing north and south. This result is the EUI of the building considering it is the typical building with regular insulation, regular windows, and no shading. All appliances

and equipment were also to be considered standard. This result is expected and is actually not super off from the EUI from Target-Finder. The form is very simple but it offers good daylighting and is great for passive heating.

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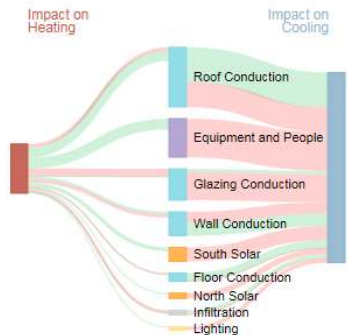
Properties

Total Floor Area 41,480 ft²



Gains & Losses

Guidance

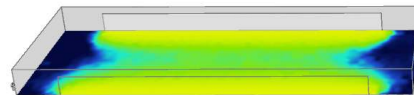
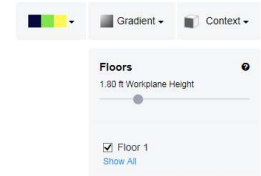


☒ Include active gains and losses

The second time the model was run through the program, all insulations had their r-values improved, especially the roof since there is a green roof. Lighting and appliances were improved to excellent and just these small changes in the building envelope have potential in reducing the EUI of the building

almost in half. Consider the EUI from Target-Finder was higher, if the building EUI could be reduced as much as this model says the solar array in the parking lot will actually be enough to give a significant amount of energy back to the grid.

Daylighting Visualization



Percentage of occupied hours where illuminance is at least 37 footcandles, measured at 1.80 feet above the floor plate.

0%

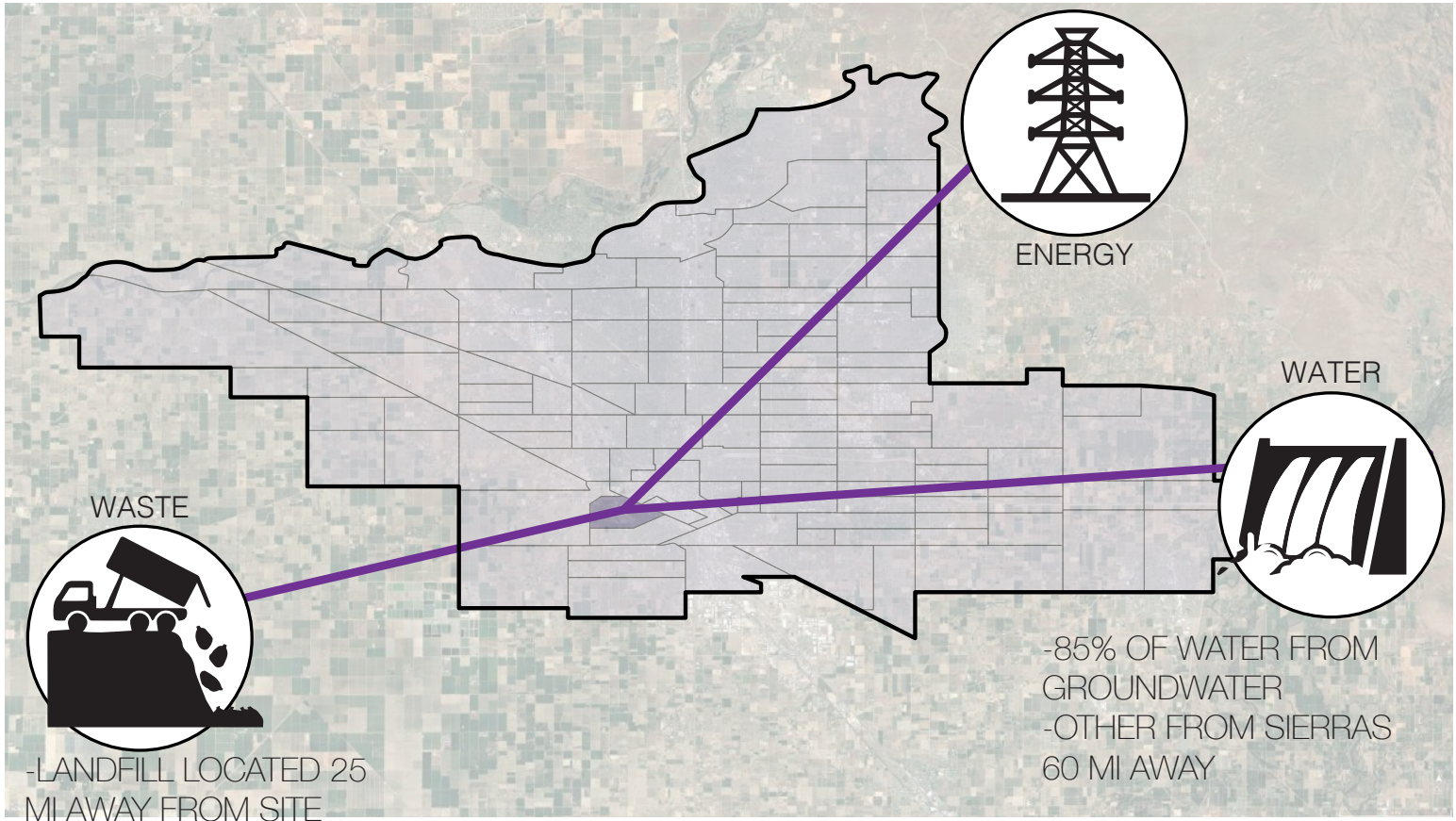
25%

50%

75%

100%

-CLOSEST POWER
SOURCE FRIANT DAM
IS 23 MI AWAY



FLORA + FAUNA

Much of the natural flora and fauna of the Fresno area is extinct or highly endangered. This is due to habitat loss not only due to mass urbanization but also thousands of acres of agricultural land. The Central Valley actually has quite a diverse wildlife background, a riparian grassland. It is important to know the history of this land, and with the historic California Drought, habitat restoration makes a lot more sense so water could be used the way nature intended to.



San Joaquin Kit Fox



San Joaquin Squirrel



Riparian Brush Rabbit

Deer-grass



Oregon Ash



Sandbar Willow



Creeping Wild Rye





Red-tail Hawk



Coyote



Fresno Kangaroo Rat



California Myotis

Valley Oak



Sunflower



California Button-bush



Reed Canary-grass



SITE



POINTS OF INTEREST



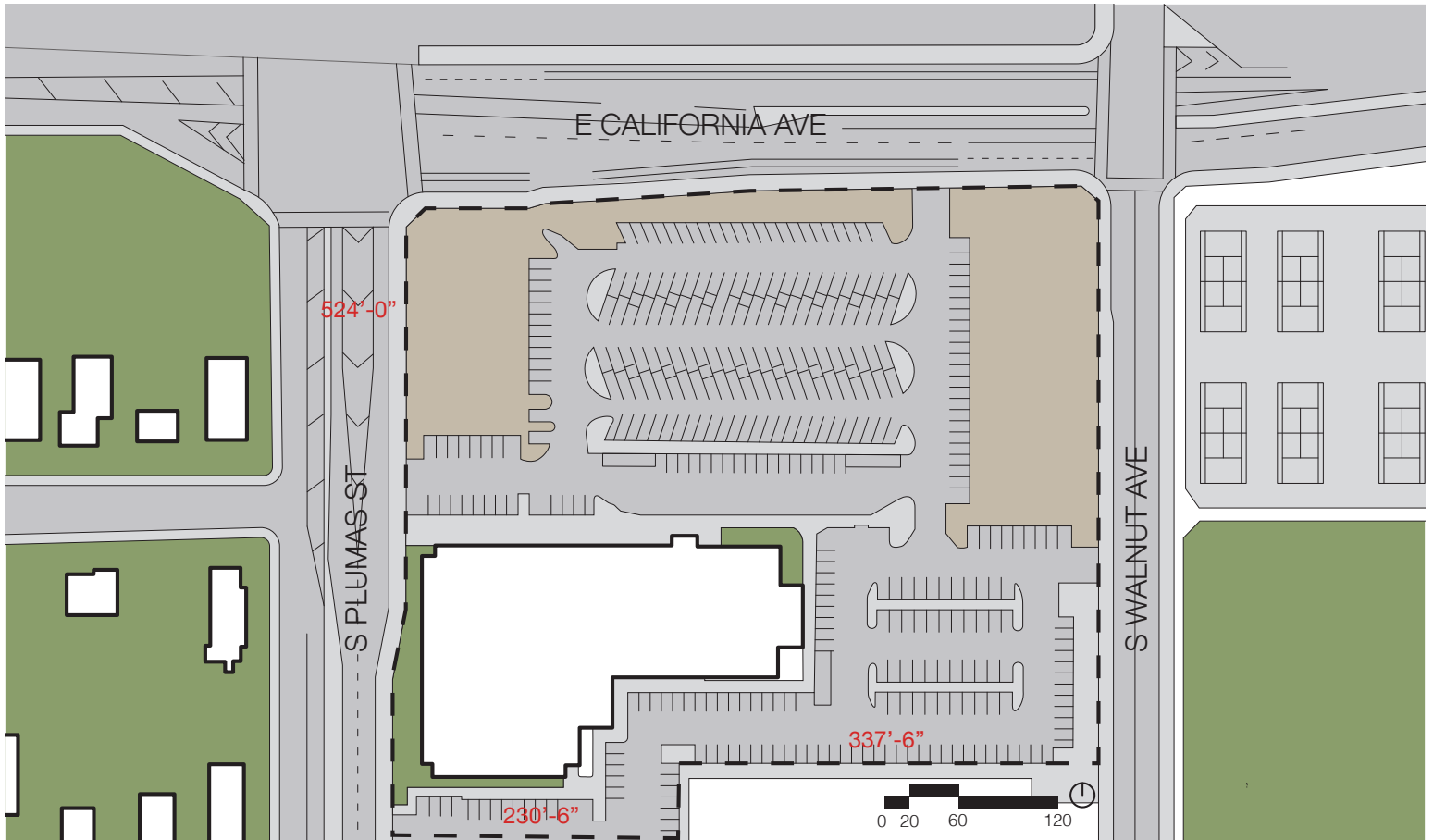
SITE

The site located in West Fresno, an area of town that is known for higher poverty and crime. This site was intentionally chosen to make sure that everyone in Fresno had access to clean air not just the rich. The site is adjacent to Edison High School, a half Magnet, half neighbor hood school that actually is has great school ratings. The school also makes for a unique demographic because since it is half Magnet, half neighborhood school, students from all backgrounds go to school together.

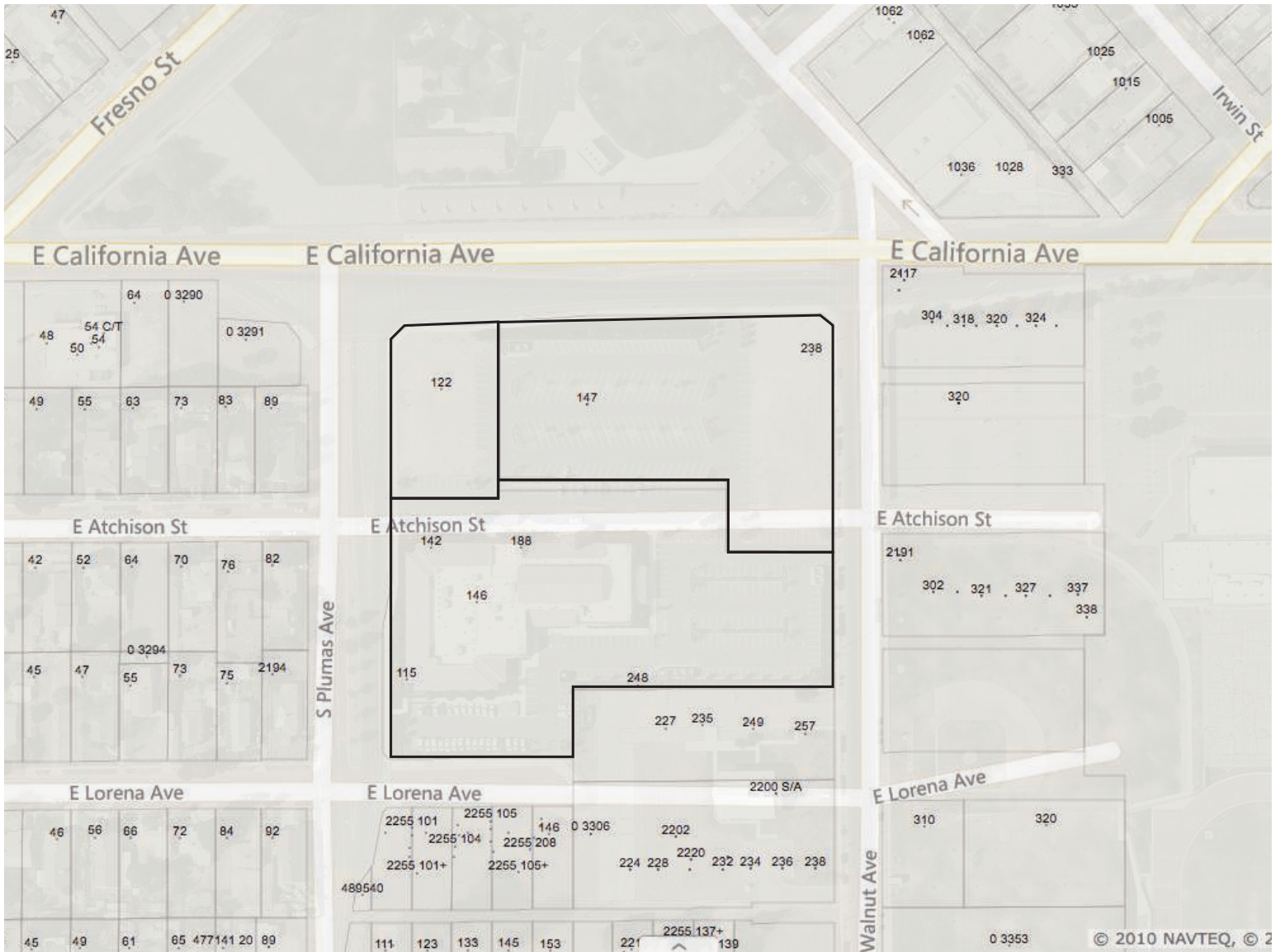
While this project is aimed at the students at the nearby schools, it is important for the entire community to be considered. Everything

nearby is either a school, church, or home and as a result the landscape seem very flat and barren. This part of town still looks underdeveloped with plots of land looking like they were once used for agriculture. It will be important to consider the surrounding context. The site is very large about 200 by 500 feet in available land and there will be plenty of challenges to develop this large lot in a compelling way.





ZONING



ZONING: NMX/ AE/ DT/ cz

Neighborhood mixed use, Air Envision, Downtown

HEIGHT: 40 ft

OCCUPANCY: A-3 Assembly

TYPE OF CONSTRUCTION: TYPE IV Heavy Timber

FIRE: Minimum setback of 15 feet from the property line

EGRESS: Must have unobstructed exits with at least 10 feet of space

ACCESSIBILITY: 2 accessible parking spots per 3,00 square feet of assembly area

TRAVEL DISTANCE: Measurement of a minimum travel distance for vehicles, such as garage entrance setbacks and stacking lane distances, are measured down the center of the vehicle travel area

This building has some building restrictions, mostly from height. The zoning is labeled as neighborhood mixed use. It also has an air envision, which simply means the area may be noisy because of the small private Chandler Airport nearby. It is considered to also be in the downtown zone, and though it is about 10 minutes away from downtown, this is already considered to be a separate and much less dense neighborhood. The building type

is considered assembly because of its emphasis on the young school community. Construction of the building will be Type II because of the projected size of the project but is subject change depending on program.

PRECEDENTS







BOSCO VERTICALE

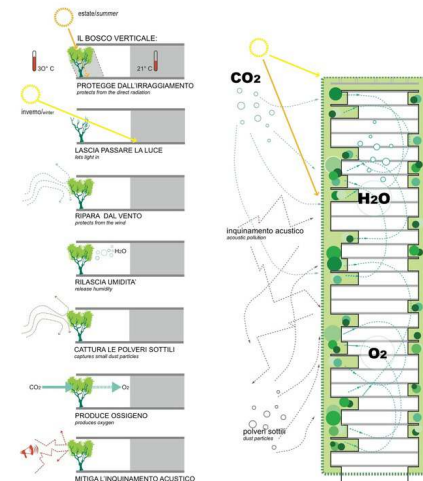
MILAN, ITALY

BOERI STUDIO

BUDGET 65,000,000 EURO

BUILT 2014

This ambitious project in Milan brings nature and trees with the residents in a skyscraper. The project includes over 700 trees and over 2000 flowers and shrubs, totaling the building with around 2.5 acres of vegetation. The result is a building that reduces noise, controls light, creates a micro-climate, reduces urban heat island effect and finally reduces CO₂ in the air. The world's first vertical forest was a challenge structurally in getting hundreds of trees to the 26 floor skyscraper. The concrete deck needed to be heavily reinforced with steel and parapets had to be taller. The building also underwent stringent wind testing, making sure that trees would not topple over from the high wind speeds that skyscrapers experience at higher elevations. To water the plants, a gray water system, meaning the water from the actual building is recycled rather than it going directly to the water treatment plant. Challenges aside, the building was successful in creating a urban landscape that cities have lost. The residents of the building will have a better connection with nature and appreciate the urban landscape. Most importantly, the building has an effective take on reducing CO₂ that doesn't require cutting edge technology and materials. It is just using trees and plants, something that we have known for a long time, to absorb CO₂, smog, and dust and in return produce oxygen. This is a prototype and closest thing to a living skyscraper at the moment and is a model for all urban landscapes to follow. It won the International Highrise Award in 2014 and the Best Tall Building Worldwide in 2015 by the CTBUH (Council on Tall Building and Urban Habitat).

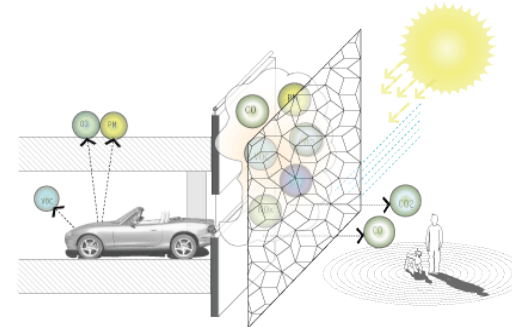




HOSPITAL DR. MANUEL GEA GONZALEZ

MEXICO CITY, MEXICO
ELEGANT EMBELLISHMENTS
BUDGET UNDISCLOSED
BUILT 2013

Mexico City also has a huge issue with air pollution. However, they are also an exemplary community on the subject matter, with bold measures used to tackle the issue. As part of a 20 billion city wide bond tackling the issue of air pollution, this existing hospital was retro fit with a ground breaking material. The facade on this inner city hospital is not any ordinary screen, it is a screen that decomposes air pollution. The biomimetic design helps the air come in contact with the material. The material, called Prosolve 370e, contains a titanium oxide paint that dissolves CO₂ into smaller and harmless particles as well as NO_x and VOCs as a chemical reaction with the paint and the sun. The result is that local air quality of the site is dramatically improved. The facade covers a 2,500 square meter wall, and while the scale of the facade is indeed very large its impact is large too. The facade is said to clean the air, so much that it does the equivalent of removing 1,000 cars from the road. The design team in Germany is happy with the reductions in pollution, but are already looking to improve the design even more by creating a material that doesn't take much energy to produce. This is a significant case study because of the scale and investment of a city did to reduce pollution. Mexico City had some of the worst air pollution levels in the entire world. Because of its aggressive campaign against it, both through policy and technology such as this material, the city has pollution levels similar to Los Angeles. They still have some improvement to make but it is really great to see what measures cities made to make these improvements happen.





PALAZZO ITALIA

MILAN, ITALY

NEMESI AND PARTNERS

BUDGET UNDISCLOSED

BUILT 2015

This building was completed for the 2015 Milan Expo is another showcase for innovative and bold design in the fight against air pollution. Architects Nemesi and Partners created what they called and “urban jungle” with the facade of the building. Based of tree branches intersecting each other, the building hopes to clean the air with 9,000 square meters of the this facade all over the building. The material used is a special air purifying cement by Italcementi. The material also uses the sun to create a reaction between polluted are and the material, converting the bad air into salts. This cement is also using up to 80 percent recycled materials, with a bulk of the aggregates actually being marble. The building also has solar panel on its rooftop making the building closer to zero net energy. The building itself is a huge six story art museum. This marks the second major project in Milan addressing the air pollution problems in the city meaning that the city is serious when it was deemed the “pollution capital of Europe” in 2008. The city has banned cars based on the digits of its license late number similar to the program used in Mexico City. They even lowered the price of its public transportation when the pollution levels rise and car bans for all take in effect for a certain number of hours in the day. The concern of the city is encouraging and the fact that architects can help with making cleaner and more efficient buildings as well as adding smog eating materials is very exciting.





SAINT CLOUD SPORTS AND LEISURE CENTER

SAINT CLOUD, FRANCE
KOZ ARCHITECTS
BUDGET 3,800,000 EUROS
BUILT 2009

The goal of this project was to create a large open space and to separate the program of adolescents and children well. The 17,000 sq ft project is located in the outskirts of Paris on rather tight lot. The design is very fun and inviting because of the bold colors used. It is a simple prefabricated concrete structure with colored glass and was simple to construct. The colored glass also allowed the architects to play with the daylighting in the building as well as reduce thermal heat gains. Their choice for a prefabricated design was to save money and energy in the construction process. The fun design really makes people want to be active in this space. The architects say that the kids are used to being told that they cannot run in the hall during school and such, but in this building those rules do not apply. All circulation spaces are three time the code requirement so kids can really be active in this building. The building wants to stand out and do something different and it achieved this in an playful yet simple way. Aspects of this project could be applied to many places and communities that want to engage and invite people to come over and be active. This isn't a conventional gym or recreational center, but rather just a place for people to have fun and be active and if it achieves that while still having non conventional program, it should be praised for it.





CASAL DE LA JUVENTUD YOUTH CENTER

NOVELDA, SPAIN
CRYSTALZOO ARCHTICTS
BUDGET UNDISCLOSED
BUILT 2011

A major renovation to an existing school, the architects gave it a big modern uplift. They wanted to create an open dialogue between the old existing school and the surrounding neighborhood and the present. The existing building is covered in a polycarbonate facade that allows for good daylighting in the building as well as create an even and simple look. It also creates a open plaza outside the building and transitions to a open floor plan that encourages social interaction. The program is said to be specific for this neighborhood and the architects claim that it would not make sense to put this program anywhere else. The program includes centers for economic opportunity. The space also targets a very specif age demographic. The building is split up into two part, an area for people aged under 12 and an are for adolescents up to their 20s. This way, the building achieves the needs of the people better with program. The space include a small library, an Internet cafe and smaller conference rooms and spaces for study. This project is attractive because it is very conscious of what the community needs and keeps the program rather simple. This is also an example of urban revival that greatly respects the surrounding community.

