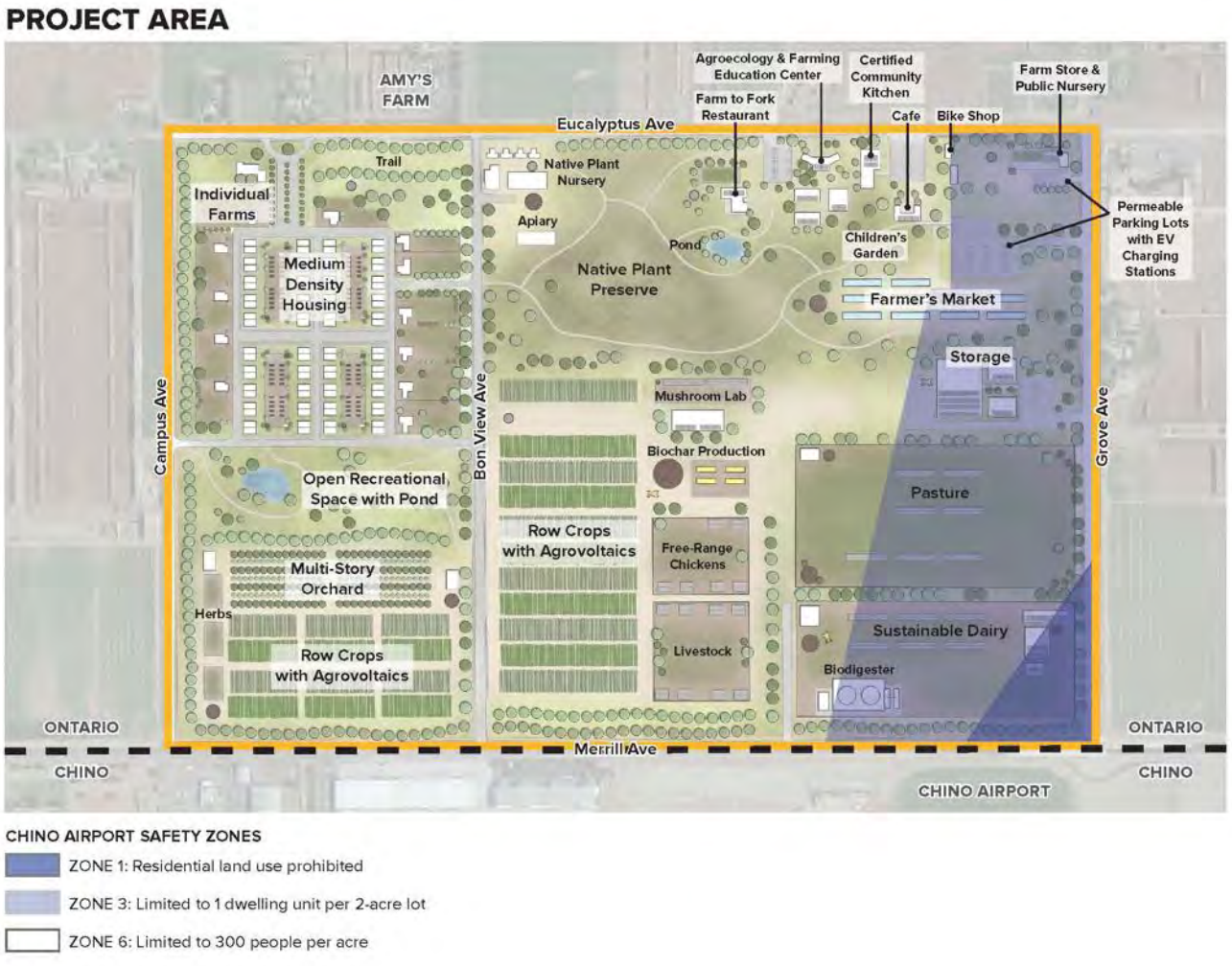
Ontario's Agrihood: A Closed-Loop, Net-Zero Farm Community

Alternate Plan for Consideration

A net-zero land-use plan to build community health, green economies, equity, biodiversity, regional food security, and climate resilience. This plan is a DRAFT and some elements will change.

The Ontario Agrihood would be rooted in community building, reciprocity, and resourcefulness. These values are integral to our vision for regenerative development, in which all elements of land use interact with each other in positive ways and create a self-sufficient community based on a closed-circuit concept. This alternate plan would have a much lower impact than the South Ontario Logistics Center Specific Plan; in fact, our net-zero plan would create less impact than do current land uses. Our plan would provide habitat to multiple species, including sensitive or threatened species mentioned in the EIR, it would sequester carbon instead of creating more emissions, and would benefit community as well as environmental health. It would also retain and repurpose the historic Borba Dairy properties for the more contemporary uses described below. Ultimately, the project would be an investment in regional food security in order to increase the climate resilience of the city and region.



Our design has resulted from a beginning community process, which we would like to develop further. Elements include row crops with agrivoltaic arrays (see below), net zero housing, and locally produced biochar and energy from our sustainable dairy. A Mycology Center (see below) urban mushroom farm would produce thousands of pounds of local food annually. The alternate plan would reduce food insecurity using regenerative agriculture farming methods that enhance biodiversity and build resilience. We would utilize the most sustainable and innovative farming techniques, including SPIN farming and aquaponics–all with chemical-free, no-till practices that build soil health. Our sustainable dairy would provide milk and create biochar—a top tier solution to climate change—as well as harnessing methane for energy production through a biodigester. A farm-to-fork restaurant would highlight the locally grown produce and ingredients through low-impact dishes. Solar panels on roof tops and integrated with crop rows would produce enough power for the whole community, to feed back into the grid, and to power emergency cooldown centers at both Euclid Elementary and on site. An intricate and innovative water infrastructure through the agrihood would conserve water, harvest rainwater for crop usage, recycle water from houses (bathrooms, sinks, and showers) that would be in addition to the already recycled water in Ontario and existing ground wells. We would ensure sanitation and health through a filtration and testing system. Instead of transporting unconsumed food scraps to methane gas-producing landfills, food waste would be processed at the on-site community-scaled composter, where it would provide nutrients for plants and eliminate the need for chemical fertilizers.

The educational community facility—possibly repurposed from the Borba dairy—will be equipped with a certified community kitchen to produce goods that could be sold commercially or at weekly farmers' markets and that would bolster other food coalitions in the community. We could also feed Ontario schoolchildren and utilize green waste from the school district to extend our feedback loop to other parts of the city. A native wildflower garden and pond would provide food sources for our essential pollinators and would create habitat for multiple bird and animal species. The native plant nursery would serve as a resource for people who would like to foster native plant habitats in their own gardens. Additionally, bike and walking trails, children's gardens, and tree canopies will foster spaces for social responsiveness, health and wellness, and mindfulness. Altogether, this closed-loop community would address food, energy, and waste, promote biodiversity, provide local jobs, and center the needs of the residents while instilling responsibility for healthy environmental practices. This small-scale project would provide a global model of how we can confront environmental issues on a bigger stage.

How to fund this? The project would be funded by a combination of state and nonprofit grants, traditional investment and development, and philanthropy. Our vision is not only financially feasible but profitable economically, with benefits to human and environmental health and climate-smart land management. The project would attract new residents, designers, and investors to the city, and would open doors to state and nonprofit funding. Agritourism would bring additional revenue to the city as well. This community would position Ontario as a national leader and global example of climate-smart, regenerative development and sustainable agriculture. Other closed loop communities have sold out quickly when they are offered on the market, and we know that this will be the case in Ontario.

How to farm this? Two regional farmer training programs—including one at Ontario's own Huerta del Valle—have trained over a hundred farmers to date in regenerative farming methods. These programs would supply a growing number of people—many of whom are BIPOC individuals from disadvantaged communities—to fill sustainable farmer and resident roles. In addition, the project would attract farmers from other parts of the country interested in joining the project.

Farmer Trainees at Huerta del Valle

Below are brief profiles of just two innovative agricultural practices that would be incorporated into the proposal: Agrivoltaics and Mycology.

Profiles of Two Innovative Agroecological Ideas

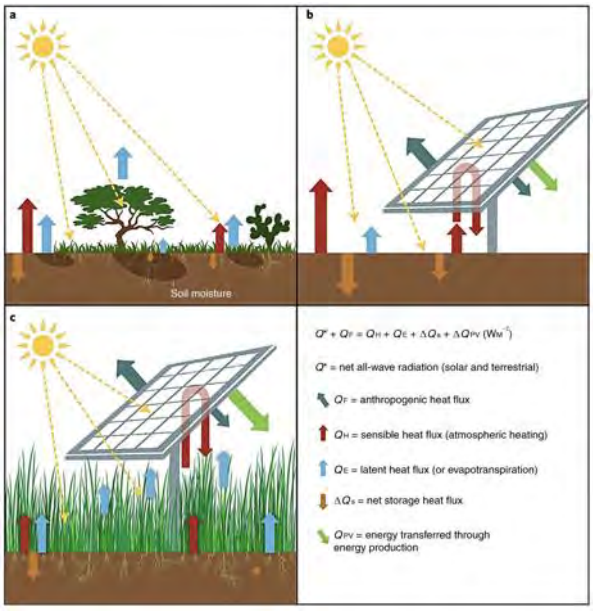
Agrivoltaics

Agrivoltaics is another innovative approach to agricultural land use that incorporates farming and renewable energy on the same plot. Mixing raised solar panels with different crops, agrivoltaics has the potential to create long term efficient, sustainable land usage that provides strong economic and environmental value. There have been numerous studies on the potential for cost efficiency, green energy production, and sustainable land use.

Solar panels are ideal infrastructure to add to agriculture due to their efficiency and how they interact with the crops. An average model will have the solar panels on stilts about 8-10 feet high with a tilt angle of ~25 degrees with three to four feet between each panel to create a substantiated amount of sun to reach the crops (Dinesh and Pearce, 2019). Studies done by Oregon State University have shown that “panels positioned above plants produce up to 10% more electricity” due to the cooling effects of the crops (Nealson, 2021). The cooler microclimate created by a varying landscape of crops and panels would keep the solar panels cool enough to maintain their productivity.

Additionally, shaded plants require less water, which would improve the water efficiency in areas prone to drought. Southern California’s current drought has and will be exacerbated by climate change. In order to meet the demand for food production, reducing the amount of water that crops need is critical. With agrivoltaic systems, the water-use efficiency for crops is over 150% greater than in systems without agrivoltaics.

There is also potential for higher crop yields and better preservation of the land using solar arrays. Cooler soil temperatures help to recharge the land from degradation by allowing soil to regain nutrients (Laura Rodríguez, 2021). Plants growing under PV panels receive less light but gain positive trade-offs such as reduced evaporation of soil moisture in dryland areas. As a result of growing crops under PV, CO_2 uptake and the crop yield of certain plants increase and others achieve equal production. For example, Barron-Gafford found that the pepper Capsicum annuum produces three times as many peppers in an agrivoltaic system and tomato plants grow more fruit in agrivoltaic settings as well. The plants are under less stress with partial shade and thus can be more lucrative (Matt Simon, 2021). Agrivoltaics would equal more sustainable and effective crop yields, less water usage, higher profits, lower resource intensity and decreased maintenance of crops. The use of agrivoltaics might also create the ability of the area to grow high-cost crops such as saffron, although experimentation must be done to confirm this.



Agrivoltaics is a better investment than conventional farming even without California and federal tax subsidies. The results of one study found that agrivoltaics provided the following:

- A 30% increase in value from farms with agrivoltaic systems over those without
- A half density agrivoltaic stilt mounted array can earn over $17,000/Ha/year–~8% more than conventional farming
- In under ten years, the system pays for itself and is more cost-effective (Greg A. Barron-Gafford et al., 2019).
- The energy from an agrivoltaic system can power the community, car charging stations, be stored for emergency use, and be fed back into the grid.

The cost efficiency of the models with the combination of profit from energy produced with the supplement of subsidies and tax benefits for solar allows for agrivoltaics to be quickly profitable.

The state has set a goal to have 100% of its electric power to be sourced from clean energy by 2045 (Camila Domonoske, 2018). Agrivoltaics in the Ontario Agrihood could play an essential role in meeting this goal. A technical report from the Nature Conservancy addresses California's need to meet renewable energy goals dependent on the land that can be allocated for this purpose. Agrivoltaics is thus a key component of a food-based climate mitigation strategy.

Agrihood Mycology Center

Within our community vision for equitable food access and climate action, mushrooms play a key part. As part of our plan, we propose the creation of a Mycology Center in the agrihood. The Center will be dedicated to cultivating gourmet edible mushrooms indoors and outdoors, researching, developing, and implementing other rehabilitative efforts with mycology including bioremediation, medicinal uses, and myco-fabrication innovations, and providing accessible and engaging educational curriculum focused on Ontario's environment and ecologies to the greater community. The Center's building can be built with construction materials grown onsite using mycelium fabrication methods to minimize environmental impacts in construction such as transportation traffic and pollution and would help define the Center as a living building. The Center would include an indoor urban mushroom farm that would use vertical farming systems to maximize mushroom yield while showcasing the beauty of a colorful assortment of fresh, locally-grown mushrooms. Cultivation methods would highlight how mycelium, which consumes organic material to produce mushrooms, can recycle and repurpose used materials we often see as waste, such as coffee grounds, cardboard, mulch, and straw. Creating strong community connections and a closed-loop system to support these resource needs would keep production costs low, while quickly producing significant amounts of healthy and nutrient-rich mushrooms that can be

affordably sold within the community and provide a viable economic income for the Center, instilling entrepreneurship. Embedded within the demonstration farm in the agrihood outside, native oyster mushroom varieties will flourish and aid in building soil health and sequestering carbon. Overall, mushrooms are a serious and under-utilized resource for climate action. Building a state-of-the-art Mycology Center and mushroom farm would catapult Ontario into leading efforts towards environmental responsibility and urban farming.

A 500 square foot mushroom farm can produce roughly 12,000 pounds of mushrooms, bringing in roughly $72,000-$96,000 annually (Craig Wallin, 2019).

Conclusion: We request more time to flesh out the specifics of this alternate plan, to find preliminary investors for the idea, and to conduct additional research to present to City Council.

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