

*Preliminary Development Plan For*

# **Eden Sanctuary Farm**

*The Future of Food*

This plan is intended solely for informational purposes. It represents estimates based on extensive research and on assumptions considered reasonable, but they are of course not guaranteed. The contents of this plan are confidential and are not to be reproduced without express written consent.

## **Executive Summary**

What follows is a preliminary development plan for Eden Sanctuary Farm which is comprised of approximately 128 acres, located in East Maui on the mauka (mountain) side of the Hana Highway in Ka'eleku. The purpose of this summary is to provide a brief overview of the agricultural development project which is being undertaken there.

Eden Sanctuary's primary farm objective is the creation of an agricultural research facility which is involved in research and development of future foods and food growing processes. The initial projects under development include the creation of a cutting edge research and demonstration facility which will feature a high tech micro-algae growing system, aeroponic/hydroponic vegetable gardens using experimental growth mediums, and hybrid fruit orchards.

Eden Sanctuary will be transferring various technologies from NASA and academic research labs integrating and applying the technology in a real world high tech farm setting. The goal of these projects will be the creation of highly nutritional future food products and processes that can be sold and/or licensed.

### **Project Development & Site Plan**

Eden Sanctuary Farm will build a cutting edge research and demonstration facility that will attract leading scientists from around the world to contribute ideas that advance the state-of-the-art in plant growth technologies.

Some of the first projects that Eden Sanctuary Farm will undertake include;

- 1) Installation of a high tech micro-algae farm photo-bioreactor system to develop and grow genetically superior strains of spirulina, blue-green algae, and chlorella.
- 2) Creation of a aeroponic growing facility.
- 3) Planting of tree orchards for experimental hybrid species

### **Management & Operations**

Eden Sanctuary Farm is owned by Eden Sanctuary Trust and will be managed by The Matrix Management Group, LLC, a Hawaii limited liability company. Matrix Management has assembled a scientific board of advisors and leading experts to assist in the development of new growing methods and technology.

### **Marketing & Financial Summary**

Since Eden Sanctuary is primarily focused on research and development activities it is expected that most of its future income will come from licensing and joint venture projects rather than crop production.

## Project Development

Eden Sanctuary Farms is owned by Eden Sanctuary Trust and its operations will be managed by Matrix Management Group, LLC, a Hawaii limited liability company. The farm property is located just outside of Hana, in East Maui. The principal activity at this site is to operate a research farm with the objective of developing future food products and experimenting with new food growing methods and technology.

### Eden Sanctuary's Aeroponic Farm

At the center of Eden's research farm activities will be a state-of-the-art, working garden and laboratory using the most advanced growing methods in the world. It will feature a space age NASA technology known as Aeroponics. It is believed that the Aeroponic growing method is the cleanest, most efficient, highest producing, most environmentally friendly method of crop production in the world.

Aeroponics is the process of growing plants in air without soil or media. Using a patented method for aeroponic crop production the apparatus supports the growth of seeds and small plants and promotes rapid growth development in an enclosed air/moisture rich environment. The aeroponic technology does not rely on vast quantities of water, which differentiates it from food growth methods like hydroponics. Aeroponically grown plants spend 99.9% of their time growing in air. The plants receive the necessary moisture and nutrients from a computer controlled misting apparatus.

The technique requires no substrate and entails growing plants with their roots suspended in a deep air or growth chamber, with the roots periodically atomized with a fine mist of nutrients. Since their inception some 30 years ago, aeroponic techniques have proved very successful for propagation. Recently aeroponic cultivation techniques were used to research controlled environment life support systems to be used in space stations of the future, and to support visitors to Mars.

Advantages of aeroponic growing methods include...

- Reduce water usage by 98%
- Reduce fertilizer usage by 95%
- Reduce pesticide usage by 100 %
- Increase yields by 45% to 75%

Eden Sanctuary Farm plans to utilize the consulting services of NASA engineers to assist its efforts in developing the aeroponic systems.

## **Aeroponics is considered the highest producing crop technology in the world.**

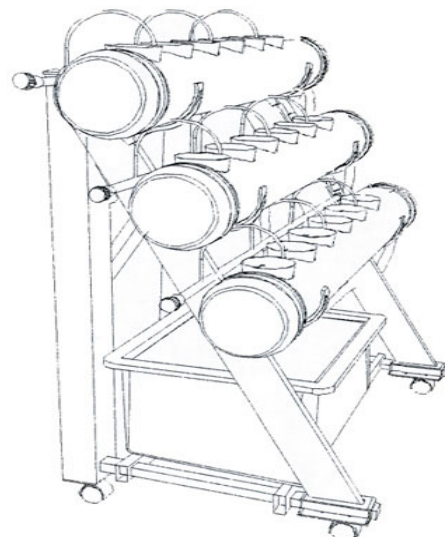


**In 1992, NASA funded the testing of state-of-the-art, soil-less crop production methodologies for growing food crops in space. In the resulting tests, aeroponic growing methods proved the clear winner over the most advanced systems that had been developed to date. Aeroponics not only significantly reduced weight (by requiring 95% less water and no soil) it also out produced the next best system by delivering 82% more bio mass (food), using only organic nutrients and no pesticides.**

The primary aeroponic system being constructed is component based and can be expanded easily. The system is comprised of grow tubes which are rack mounted and added onto as needed.

The grow tubes are 6" in diameter and up to 10' in length. Strategically designed in tiers the growing tubes will maximize growing space and provide a perfect environment for nutrient disbursement and system maintenance.

Inside the grow tubes are precision placed jet spray misters. The feeder line connects to a larger feeder tube that is connected to the aeroponic pump, which connects to the nutrient tank. A water cycle timer is connected to the aeroponic pump, allowing the misting system to perform multiple on and off cycles. The drain system connects to a manifold that connects to the nutrient tank, for easy drainage.



Approximately .75 acres will be dedicated to vegetable crops which will be grown in traditional soil as well the aeroponic method to create a control group for scientific comparison purposes. Experiments will be conducted on different nutrient growth mediums to optimize the best program. Although these gardens will take up relatively little space, when operating in a full production mode, it is estimated that it will produce up to 20,000 pounds of produce annually.

## Eden Sanctuary's Spirulina Research Farm

Spirulina is considered the ultimate future food. Spirulina is a micro-algae that is 60% protein and contains all the essential nutritional elements to sustain life. It has been called the perfect food. An on-going research project is being conducted to enhance the level of beneficial nutrients. Using farm science and cooperating with researchers from around the world, the goal is to create a super spirulina with more minerals and bioactive phytonutrients with a greater bioavailability than conventional food supplements.



Spirulina cultivation at Eden Sanctuary Farms will not cause pollution, soil erosion, or water contamination. Spirulina is grown without toxic pesticides and herbicides. Its rapid growth means spirulina protein needs 20 times less land than soybeans, 40 times less than corn, and 200 times less than beef production. Spirulina offers more nutrition per acre than any other food. Even though spirulina grows in water, it uses far less water per kilo of protein than other common foods. The only significant loss is by evaporation.

Spirulina and other high value algae needs hot temperatures to grow well. The temperature at Eden Sanctuary in East Maui is perfect for growing micro algae. To maintain a pure culture and increase growth rates Eden Sanctuary is installing a growing system called a photo-bioreactor. Advantages are increased productivity, less water loss from evaporation, screening out contaminant algae, greater control over the culture, and ability to grow a pure culture of algae. This requires a relatively small space for a very high yield of product.



**Plexiglas tubes and coils act as solar collectors. Algae is pumped continuously through rows of connected flexible transparent tubes or coils. Much greater density can be maintained than in open ponds**

## Eden Sanctuary's Experimental Fruit Orchards

In addition to its high tech intensive growing labs, approximately 3 acres have been dedicated for orchard trees on the property to experiment with various hybrid fruits.

These trees will be started inside the aeroponic chamber, allowing them to grow in an abundant amount of air, moisture and nutrients and then transplanted to the orchards and carefully monitored to see how well they produce.



The aeroponic propagation system is extremely economical when compared to traditional methods of growing plants due to the high yields and how fast plants can be grown in the system. Similar systems have been proven to aid growers in optimizing rooting on easy-to-root and hard-to-root plants and trees. This technology will provide an environment to maximize the overall total yield of healthy root cuttings for the test orchards.



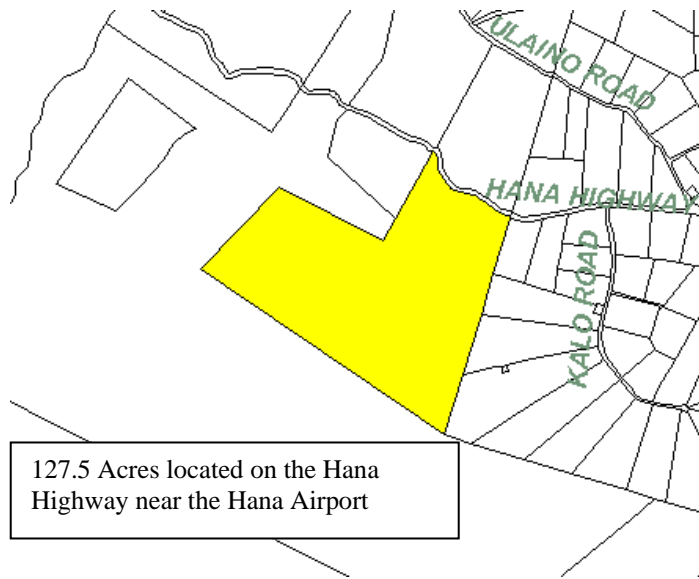
### Fruit Orchards

This is a 3 acre site located just below the main farm dwelling and will be planted with approximately 100 trees of various species; including breadfruit, banana, papaya, passion fruit, lemon and lime, avocado, jackfruit, Hawaii chili-pepper, jaboticaba, mountain apple, golden apple, starfruit, noni, rambutan, durian, eggfruit, and others.

## Site Development Plan

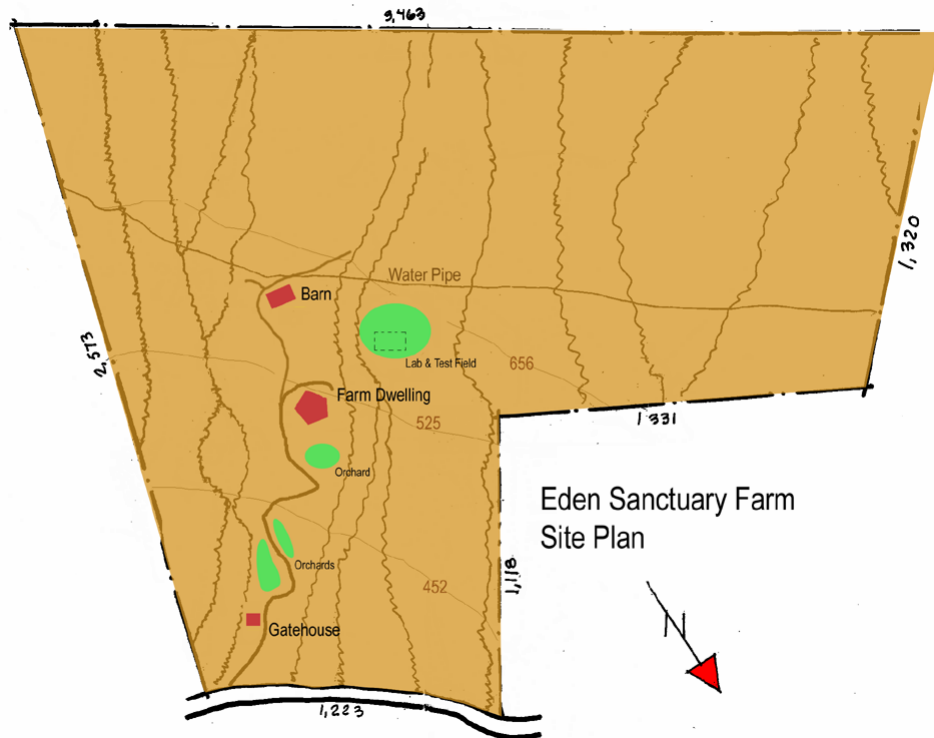
The project is located in East Maui on the mauka (mountain) side of the Hana Highway in Ka'eleku.

Comprising 128 acres in total, only a fraction of the land resources will need to be developed due to Eden Sanctuary's high tech approach to its farming operations.

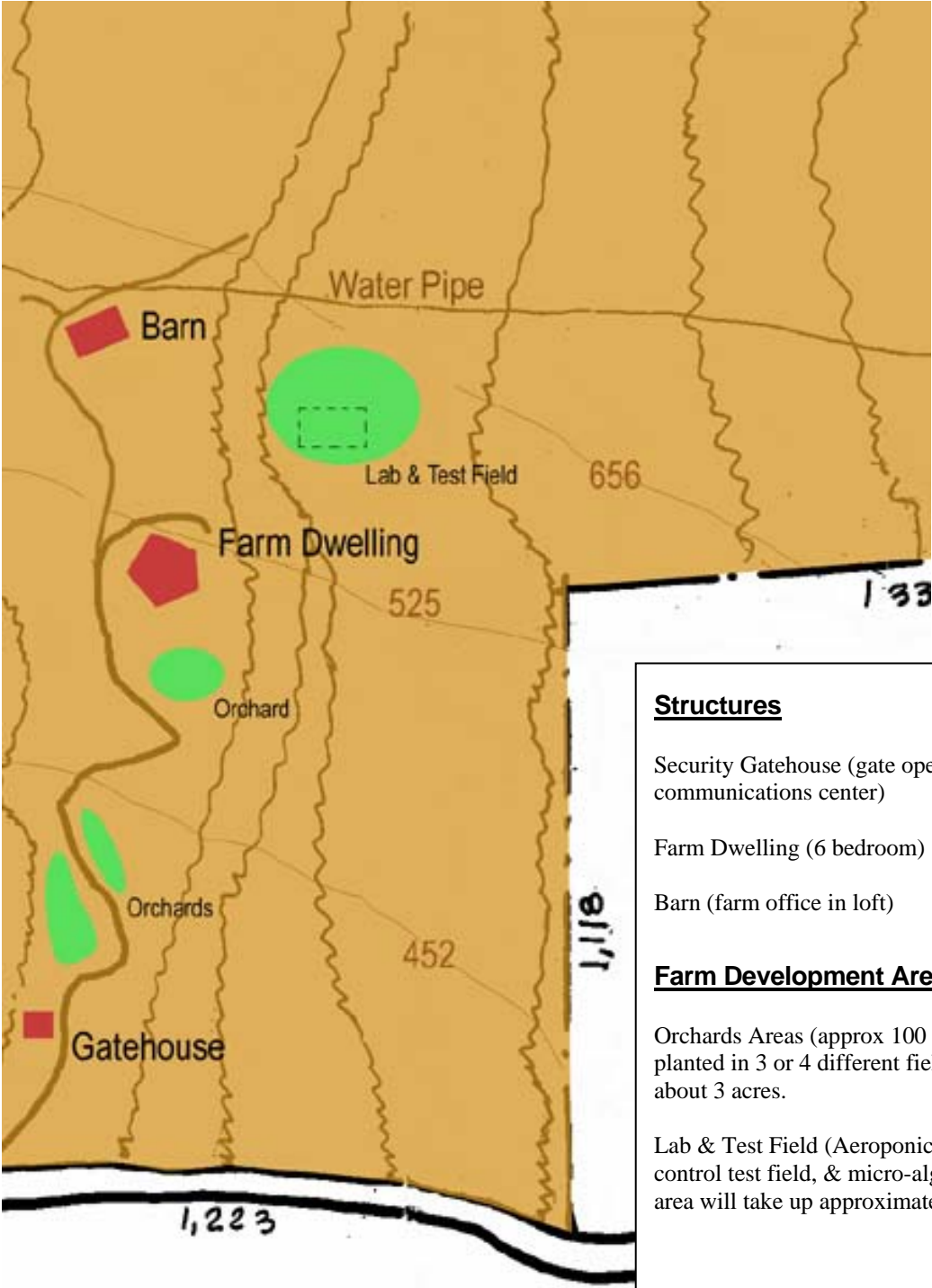


## Site Map

Site development at Eden Sanctuary Farm is designed to preserve agricultural land, optimize solar access and minimize any environmental impacts. The site maps below indicate the development areas for this project.



**Planned Structures and Farm Areas**



## **Management & Operations Summary**

Eden Sanctuary Farm has entered into a management agreement with Matrix Management Group, LLC, a Hawaii Limited Liability Company to operate and manage its farm research business.

### **Matrix Management Team**

The Matrix Management team is managed by Dane Spotts and Joni Dourif who are also Trustees of Eden Sanctuary Trust.

Mr. Spotts, CEO, is a seasoned business professional with over 25 years of success in entrepreneurial high technology related enterprises. Ms. Dourif is currently the President of an international research company that utilizes a formally top secret data collection technology developed by the Pentagon. She will act as the Director of Research and Technology Transfer.

Matrix Management has retained the services of Nicholas Scott, a scientist and engineer who is currently employed by NASA (National Aeronautics & Space Administration). Mr Scott is a scientist and bio-technology expert for NASA's space program and has worked on the mission to mars as well as other high level technology projects. Mr. Scott will act as Eden Sanctuary's Chief Technology Officer, and will provide his expertise in the development and building of the aeroponic and micro algae growing labs, as well as assist with future research projects.

In addition Matrix Management has contracted Kevin Pirolo as its Operations Director to facilitate day to day operations. Kevin was formerly the president of a multi-million dollar communications company and will assist in the development of Eden Sanctuary's marketing and business affairs.

### **Technology Transfer**

The primary technology for the initial operations to be undertaken at Eden Sanctuary Farm is to be transferred from NASA and University research labs. Some of the technology is proprietary and includes patented methods and processes which will be applied at Eden Sanctuary and expanded upon. There is now a strong body of research on aeroponic growing methods from a number of University and government studies which will be applied in this project. Most of the equipment is commercially available and that which isn't will be fabricated and installed on-site.

### **Time Table**

It is anticipated it will take approximately 24 months for completion of the first phase of development which includes building the initial structures and installing the aeroponic lab and micro-algae farm. Much of the orchard stock and test planting areas will be installed during this time frame, and added to on an ongoing basis.

## **Marketing & Financial Summary**

This is a brief summary of the initial products intended for sale.

### **Product Description Summary**

There may be a myriad of future food product and food development technology to come out of the research environment being created at Eden Sanctuary Farm. The question is how will these activities create revenue and sustain the operations. There are four revenue producing categories planned at present

- 1) Sale of farm produce. Though it is intended to grow produce for research purposes and develop new high tech growing systems, it is estimated that up to 20,000 pounds of fruits and vegetables a year can be produced from this facility. Much of this material will be offered to local markets or donated to families within the community.
- 2) Micro-algae products and systems. The goal is to develop new hybrid super spirulina and other micro-algae products. Based on the success of this endeavor these micro-algae farms may be expanded and the end products which result in a powder sold commercially to wholesale health food distributors. In addition these micro-algae farms and the associated technology developed at Eden Sanctuary will be offered for sale on a global basis.
- 3) Development of micro-farming technology for consumers. A prototype aeroponic micro-farm is in the process of being developed which can be offered to the consumer marketplace for under \$300 which will include Eden Sanctuary branded seeds and nutrients developed at the Hana, Maui facility. The market for this product is primarily urban consumers who have little time or space for gardening.
- 4) Licensing of the technology to other manufacturers and the sale of hybrid seed and nutrient products.

### **Market Analysis Summary**

Organically grown produce is the largest growing segment of all agricultural products. Growing at an amazing 24% per year, Eden Sanctuary intends to focus on this growth segment and develop products around a growing desire for highly nutritious healthy foods. By offering new technologies and methods to grow this category of food using economical and environmentally friendly methods, it is believed that several unique market niches can be served.

### **Financial Summary**

No significant income is projected for the first 24 months of operation while the project is in its research and development phase. Initial funding for farm operations will come in the form of research grants and loans.