# Lagi

Keywords:

Regeneration, resource conservation, evolution, dynamic installation, local identity, settlement out of time, minimal Footprint, innovativeness.

**MAIN IDEA:**

Considering the territory of Fly Ranch, our team, first of all, highlighted the features of the historical significance of this place and the principles laid down by the authors of the competition: Power, Water, Regeneration, Food, Shelter, - on their basis, we put forward the postulate Evolving Community in Oasis (ECO).

As urban planners, it was important for us to emphasize the historical identity and the correct connection with the environment of the future settlement. 10700 b.c. there was a lake called Lahontan that covered all Fly Ranch territory as well as Black Rock City and had in total a surface area of over 8,500 square miles. Nowadays, there are some small lakes that are replenished by streams and rivers that come from mountains. Our purpose was to create identical spaces subsequently we have projected three volumetric structures: “Nautilus”, “Hippocampus”, “Jellyfish”. The theme of underwater organisms was inspired by the local shrimps, which are able to adapt to changing conditions and survive both floods and droughts.

Three main structures will provide shelter from sandstorms, rains and wind, creating an “oasis” for a new community. Besides comfortable conditions for living and working, in case of making eco-settlement with minimal Footprint, it is proposed to place five dynamic sculptures-indicators. For clarity of observation of the reducing harmful emissions to the local environment and global climate we propone one sculpture-indicator for each principle. Indicators will show amount of water, energy, food and waste consumption. Observing through the prism of sculptures their own impact on the environment, each resident will see his contribution to the issue of nature conservation and natural biogeocenosis.

**indwellers:**

It is supposed to be inhabited by remote working groups of the world community, tourists (including visitors of Burning Man), as well as people passionate about creating a new environment - a settlement that can constantly be changeable and community-driven depending on the needs of local society.

In different seasons, the population will change depending on the visitors: tourists (at the time of the Burning man and its preparation); scientific researchers from various fields (for conferences, exhibitions, experimental VR spaces).

**dwelling**

Nautilus

Main part of the new settlement is located in “Nautilus”, which consist both: living and public spaces. For a comfortable stay, the central volume has a lowered number of storeys. It has a form inspired by fossils of ammonites and nautilus. Mollusk shell in plan gives the settlement a complex structure. In central part oasis-like area is hidden from winds and sandstorms. The dominant of “Nautilus” is an observation tower that rises above the green area and the amphitheater. From this high, citizens can see Fly Geyser, the hot springs, other sites of the Ranch, mountains, small lakes and lights of Black Rock City. The core element of “Nautilus” is a public zone elevated above living cells. It has workshops, bars, café, utility rooms and commercial zone. Residential yards are attached to this core and dispersed like tentacles. Furthermore “Nautilus” is connected with another structure “Hippocampus” by a cable car route, that could be extended to the Black Rock City. The availability of cable car and bicycles will reduce Foot Print on the environment.

**Coworking SPACE:**

Quiet zone, for the comfortable work of self-employed and other public spaces are supposed to be located in the following volume - "Hippocampus". The local public zone is put into the pavilions that are protected from the sun by awnings and pergolas. The space under the awnings can be used for sports activities, yoga, dancing or lectures. In the compositional center there is a square with ponds dominated by the one of the five installation. Under the monument, there is a recycling room with low-temperature pyrolysis plants. These closed-cycle plants do not emit combustion products into the atmosphere. However, the fuel obtained in the process useful to supply energy and fertilize the soil. The more garbage is recycled in a day, the brighter the globe on top of the installation will glow at night.

**EXPERIMENTAL PART:**

The experimental part of the city is located in the third volume - "Jellyfish". It is a most distant site of the new settlement is placed on a previous location of Burning Man (1997). Its feature is the ability to transform / rebuild / regenerate. Due to the easily transformable pneumatic structures and the prefabricated frame of the main dome, the volume can be rebuilt using the old materials (fabrics, ropes), only by altering or changing the joints. The appearance of the volume is in harmony with the surrounding nature - a light balloon rises from the "rocks" of the desert. Inside there is a prefabricated frame and a VR room with service rooms.

The functionality is just as extensive. As an experimental project, it is planned to arrange VR spaces inside for testing various new environments, holding virtual exhibitions, forums, and festivals. Considering inner space as a special area for virtual space we think about new ways for creating and regenerating interiors without using of any construction materials, thereby reducing construction costs and making “zero”- impact building.

**INDICATORS:**

**Power**

The settlement takes energy resources from the processing of its own waste and waste that remains from the Burning man festival. Technology of low temperature pyrolysis allows to burn waste without toxic emissions. As an indicator on the pedestal in the center of the pavilion "Hippocampus” there is an allegorical globe in the hands of a person, which lights up like a beacon in the evening.

**Water**

The water used by the settlement is obtained from underground sources. The presence of ground open channels ensures represented in the "Nautilus" pavilion sufficient air humidity for a comfortable stay of local and visiting people. As an indicator we consider to make a dynamic sculpture of 3 fishes skeletons on the lake that lay on the way of cable car route. These fishes will light brighter if the quality of water is in the sufficient limits. The edges will light up to warn about the exceeded amount of water consumed by the settlement.

**Regeneration**

The concept of regeneration by our team is considered globally - as “zero”-impact settlement, that could generate products, regenerate water and deal with garbage. In terms of the materials “regeneration” we have interpreted as materials and constructions that could be rebuild as tent and pneumatic structures in “Hippocampus” and “Nautilus” pavilions. From the same point of view, the “Jellyfish” pavilion is a modern way to reduce the anthropogenic load on the environment. The dome space is sufficient for holding massive exhibitions, lectures, as well as experimental venues and forums in VR format. Experimental models of new spaces based on VR technologies or laser beams will represent easily and “zero”- impact regeneration (transformation) of an inner space.

**Food**

Provision of food takes place thanks to the existing fields, many of which, if necessary, can be equipped with vertical open-air farms with automatic irrigation and collection of products. Some of the new soil comes from recycling. An indicator of food availability and production is the mirror ball: with sufficient production, the ball gives a clear reflection of the crops planted under it. With a lack or too much (over) consumption, the glass material, thanks to an electric switch, changes its chemical state and becomes dull, ceasing to reflect the space around.

**Shelter**

Fly Ranch - located in changing weather conditions, this place is characterized by sandstorms, increased solar radiation, etc. To ensure the comfort of living, the central facility has a dynamic roof that can provide shelter in bad weather and leave an open sky for insolation, stargazing, etc. the elements of the shelter are awning structures that can be opened and assembled in the shortest possible time. As load-bearing elements - trusses and arches, awnings - from canvas fabric. In this way, we create a dynamic design that can change depending on the conditions, and also increase environmental friendliness due to the easy interchangeability of elements.

**CONCLUSION:**

“Zero”- impact settlement - should become a modern prototype of an ideal city, however, adhering to the planned geometry, the settlement can quickly change to meet the needs of people and modern trends. Its innovative nature should attract a large number of self-employed, creative and open to the world people, capable of changing the understanding of what a modern city can be in such difficult-to-develop territories as the desert. The references of the forms of the main volumes to the history of the place give the settlement an identity. And the sculptures-indicators will help to avoid the psychology of the masses, which is often found in cities, when responsibility is redistributed to others, since with the help of dynamic sculptures displaying the processes taking place online, each person will be able to see their contribution to the ecologists of the place.

**Engineering solutions in our project**

The Fly Ranch area is located far from the large settlements, on an arid land area, so there are difficulties with energy supply and disposal of garbage.

The solution to these problems can be found in the technology of low-temperature pyrolysis. The pyrolysis process consists in the destructive transformation (thermal decomposition) of organic compounds into hydrocarbons with a lower molecular weight when exposed to high temperatures, limited access of oxygen and the presence of water vapor. The end result depends on the chosen direction of the process. Conventionally, two areas of pyrolysis can be distinguished: raw materials and waste disposal. Also, there are two main methods in which the pyrolysis process is carried out:

- Dry pyrolysis;

- Oxidative pyrolysis.

Dry pyrolysis takes place at different temperature conditions:

1. At a low-temperature pyrolysis of 450–550 °C (semi-coking) occurs, which is characterized by a maximum yield of liquid and solid residue (semi-coke) and a minimum amount of pyrolysis gas with a maximum value of the heat of combustion. Using this method, primary resins are obtained and non-commercial rubber is processed into monomers, which are used for secondary production of rubber. The solid residue is used as energy and household fuel and fertilizers.
2. 2. At a temperature of 800 °C, medium-temperature pyrolysis takes place, which is characterized by a larger gas yield with a lower characteristic of combustion heat and a small amount of coke and liquid residue.
3. 3. At a temperature of 900–1050 ° C, high-temperature pyrolysis (coking) takes place, which is characterized by a minimum yield of liquid and solid residues and a maximum amount of gas produced with a minimum value of the calorific value. The product is a high quality fuel suitable for long distance travel.

Low-temperature pyrolysis (up to 450–550 ° С) differs doesn`t require special sorting of waste. It has a closed cycle of smoldering in a vacuum chamber, which doesn`t lead to emissions into the atmosphere. It can process wood, plastic, rubber and liquids. The products of solid waste pyrolysis are absolutely safe from the ecological point of view, it can be used as fuel, valuable industrial raw materials. The products obtained in the course of pyrolysis of municipal solid waste can serve as sources of electrical, thermal energy, heating oil, liquid fuel and can also be used to re-obtain rubber.

The project envisages the placement of 3 pyrolysis chambers hidden in the base of one of the installations of the “Hippocampus” section. Garbage can be loaded into chambers in two ways:

1. Direct disposal of debris into a chute installed next to the installation. Residents of the settlement themselves can throw off small waste.
2. Garbage delivery by special transport from the southern part of the site hidden from the public area.

Thermal pumping stations located in the public area of the “Nautilus” within the solar panels located on the roofs of residential blocks site can serve as an additional source of energy.