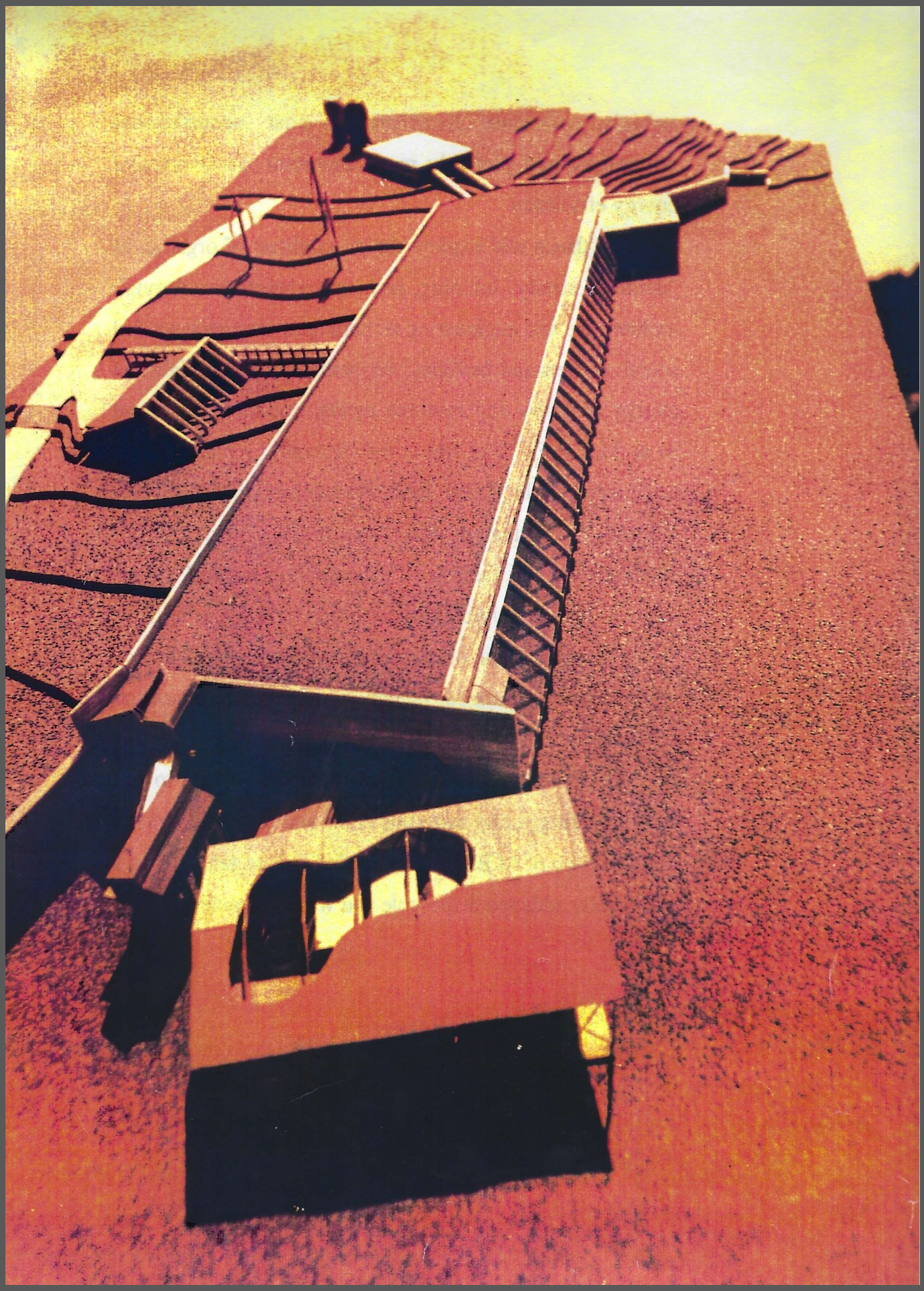
CARBON COUNTY RECYCLING FACILITY

THESIS 1989

PETER LUSK



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Precis

A building that benefits society by its programmatic function, would be infinitely improved if the actual construction and unprogrammatic existence of that structure enhanced its environment's (site's) operation. So that if that building were abandoned, it would still be an integral, active part of its ecosystem, benefitting the environment, and hence man. Through the use of passive design and construction technologies, architecture can be environmentally sensitive. With certain global, regional, and site specific strategies, architects can, and should enhance and sometimes rehabilitate a site and/or ecosystem. If architects take into consideration and explore how to benefit a site, as well as society, we must reanalyze construction methods, material choice, and design goals according to overall environmental sensitivity, not the ever changing, irresponsible fad of architectural fashion. This analysis must be guided by consideration of material choice [ie. net environmental (multigenerational) effects of wood, steel, aluminium, and concrete production, transportation, and assemblage]

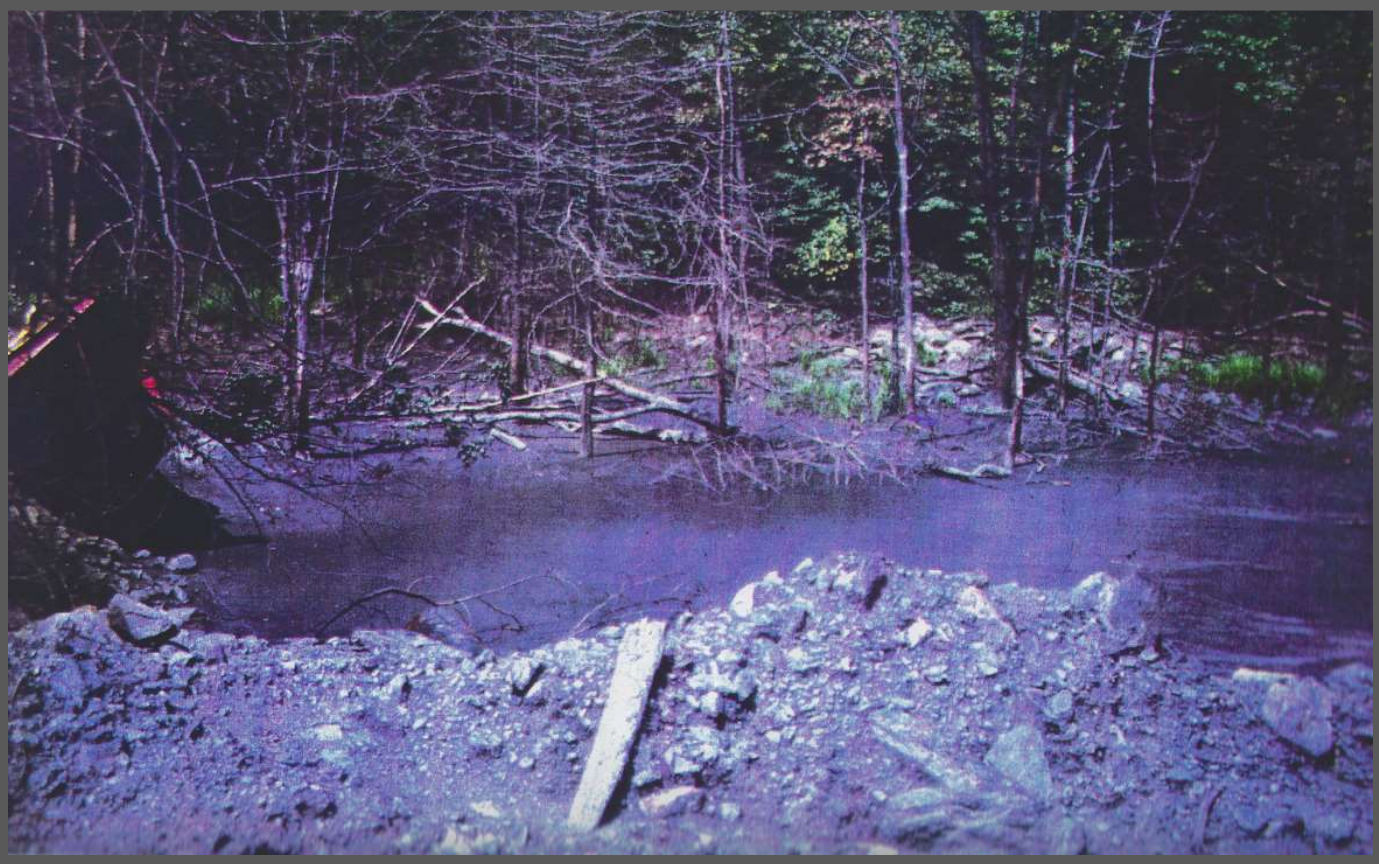
vehicle existence justification, post occupational operations, and probably most important, passive/active energy efficiency

This thesis will explore the possibilities of organic, or "dynamic steady" building, and land rejuvenation through architecture and engineering technologies to create needed social markets and facilities. My vehicle is a materials and energy recovery and research center, commonly referred to as M.E.R.F.s. The site is the Nescoal " rehabilitated " coal mine/shale dump near Nesquehoning in Carbon County, Pennsylvania, which has an 18 - 30 month life expectancy. The facility will incorporate state of the art passive design technologies to research, store, test, treat, and process solid and hazardous wastes (unused resources), while housing a park for human interaction and education of needed social responsibility. Although source reduction and efficiency are the only sustainable solutions to our emerging energy and materials crisis and misuse, I believe that this type of M.E.R.F. is a needed step to rehabilitate a chronically addicted disposable and wasteful society.

Project

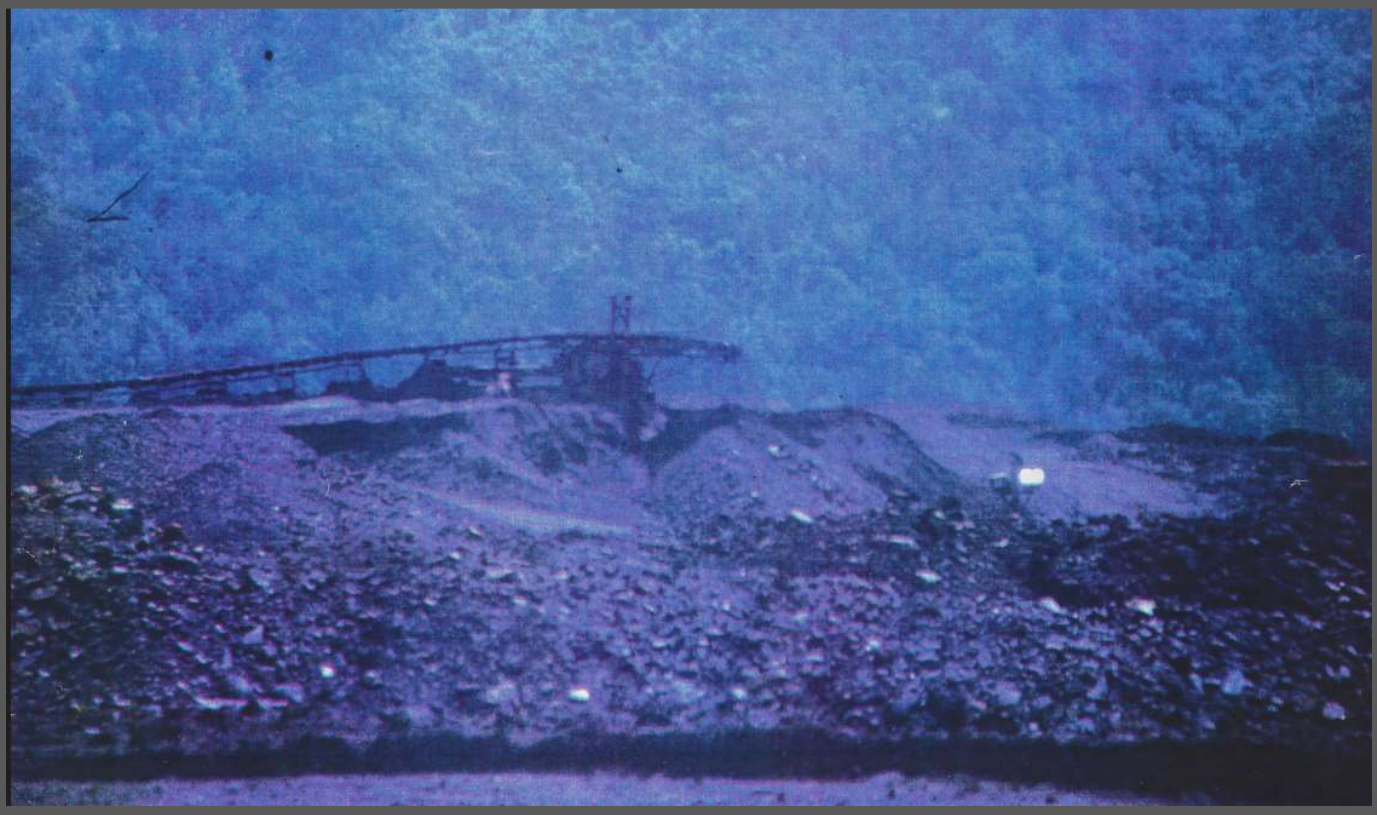
The project will be designed in a series of continual phases. Although these phases are actually not separated, they have been grouped to show different levels of facility maturity. The final project will show "organic growth" of the complex and the progressive rejuvenation of the site. This life span of the vehicle will be represented by a model, computer generated drawings, collages, and photo/video images, and relevant sculptural display elements. The local environment is incorporated into the project.

Development of detailed passive technologies and spaces is imperative to the success and believability of this project. The project is presented in hypothetical and representational media, as well as in actual experimental construction methods. This makes the project a learning opportunity for its designer and his peers--particularly with respect to materials reuse.



Site

The site chosen for this project is an exhausted coal mine in Carbon Co., Pennsylvania. It is a small (1 square mile) heavily degraded plateau of dumped coal mine tailings. As stated in the precis, the tailings are currently under reprocessing to extract valuable anthracite, from which the area first boomed in the mid 1800s. Review of neighboring quadrangle maps reveals that this particular site is only a small part of hundreds of square miles of operating strip mines. Once complete, the recycling center described in this project will stand in marked contrast with its neighboring sites. Through enclosed pictures of the site one can see the almost lunar landscape that is so removed from its indigenous environment because of such absolute degradation. Before rejuvenation, the site bleeds run-off pollution. Moreover, if allowed to have its common use, the imposing pollution that will inevitably be emitted, wrenched from the site and local ecosystem. The drone of man's immense, dinosaur-like mining machines add to the site's agony and submission to man's misguided will. This habitual, repeated rape and scarring of this land speaks of man's attempted control over and waste of nature, possibly more than any architectural edifice of our time.



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Essay

> ***"Epimetheus, Prometheus' younger brother, precipitated the world's first materials crisis. Charged with allocating the Earth's resources to it's creatures, he gave wings to some, shells to others, but was so recklessly extravagant that he ran out before he came to human beings. Prometheus solved this crisis by stealing fire from the sun and giving it to mankind. With energy, the ultimate resource, humans could forever fashion tools and shelter from the abundant elements in the earth."***

Energy inefficiency of industrial societies, coupled with increasing overpopulation, is the biggest threat to stability of life and global ecosystems. "Modern" man, especially in the United States and growing industrial nations, lives in a high material and energy waste society. As Americans, we lead the world in fossil fuel consumption and materials use; not a very good example of a nation with the highest "standard of living." Other countries such as Japan and certain European countries make it easy to participate in recycling programs and inconvenient not to. U.S. inefficiency is not limited to either industrial, commercial, or domestic energy and material use, but is an inseparable combination of all three. Although American inefficiency

must be individually and collectively prioritized within each category, my project reflects a way to attack this condition while trying to find solutions to educate and inform America on how not to be a "disposable" society. A recycling center, an alternative to continued neglect of social concerns, could nevertheless propagate our disposable society, unless it is designed in such a way as to encourage the user to become more socially or environmentally responsible. The increasing economic pressure for material disposal, and in some categories, material scarcity, now guarantee a lasting market for efficient material use and recycling.

In order to achieve harmony between architecture and the environment, designers need to analyze what and how building is done, while weighing environmental costs and efficiency of building function. This will not only guide the choice and use of materials, but also guide the design's active involvement in or alienation from it's immediate environment.

All materials, conserved or wasted, have a far reaching history of energy consumption. Energy, both high and low grades, is always used to mine, transport, process, and increasingly to package and dispose of building materials, as well as consumer goods and services. Energy alternatives were investigated in reaction to the energy crisis of 1973. A worldwide oil distribution shortfall demonstrated the extreme sensitivity of the world economy since it was a

society that based its economic growth on increasing energy inputs and resource consumption.

Since this rude awakening in 1973, many regional, national, and international organizations have explored both hard (post problematic remedies, such as recycling) and soft (preventative solutions, such as source reduction) alternatives to increase global energy efficiency. Recycling has long been accepted as a substantial and inseparable component of a global energy efficiency goal. Exciting experiments (at R.P.I. in Troy, New York) using recyclables as actual building components were done in the 70s and 80s, while progressive programs in collection and separation of recyclable refuse are currently being developed at universities and institutions worldwide.

Engineering (and architectural) technologies can be planned to be less environmentally detrimental if designers prioritize long term resource conservation instead of placing total emphasis on short term, immediate economic gain. Because my vehicle will be using collected "disposable" materials, with an otherwise short term life span, for construction as well as processing, it does two things for the current material base. Materials directly used in construction (bottles, cans, shredded Styrofoam, etc.) are removed from a short "one-shot" life-cycle and given a long term second use. These materials are cheaper (often free) than virgin construction materials because they require less energy expenditure, both monetarily and environmentally.

This gives "worthless" materials value, due to competition with the construction materials market. Processed materials are reintroduced into the market, thus conserving the resource base by slowing virgin material consumption. By incorporating both material use strategies, my M.E.R.F. will not only expose the user to the value of materials that society regards as useless and valueless, but also, hopefully, educate him on the urgent need to conserve what we take from our environment.

All organisms, in their design, appear to contribute to a sustainable earth society, and live in dynamic steady states until affected by an outside growth oriented influence, such as "modern," socially irresponsible man. This current philosophy expressed in many texts on global ecology (a field of scientific research spanning over 20 years) and has played a formative role in architecture for over 40. If one looks at the later work of F.L. Wright, among others, one can see the integration of, and mutual respect between, site and structure that help to make these buildings harmonize with nature. Buildings and society must begin to be designed as sustainable, environmentally cooperative "organisms", otherwise they become detrimental, environmentally foreign carcasses, contributing waste and impeding natural rejuvenation of space (a unique phenomenon which man depends on and is just beginning to comprehend). Man cannot fully cooperate with nature, by which he is ultimately

governed, unless his architecture cooperates and is governed by his environment and ecosystem.

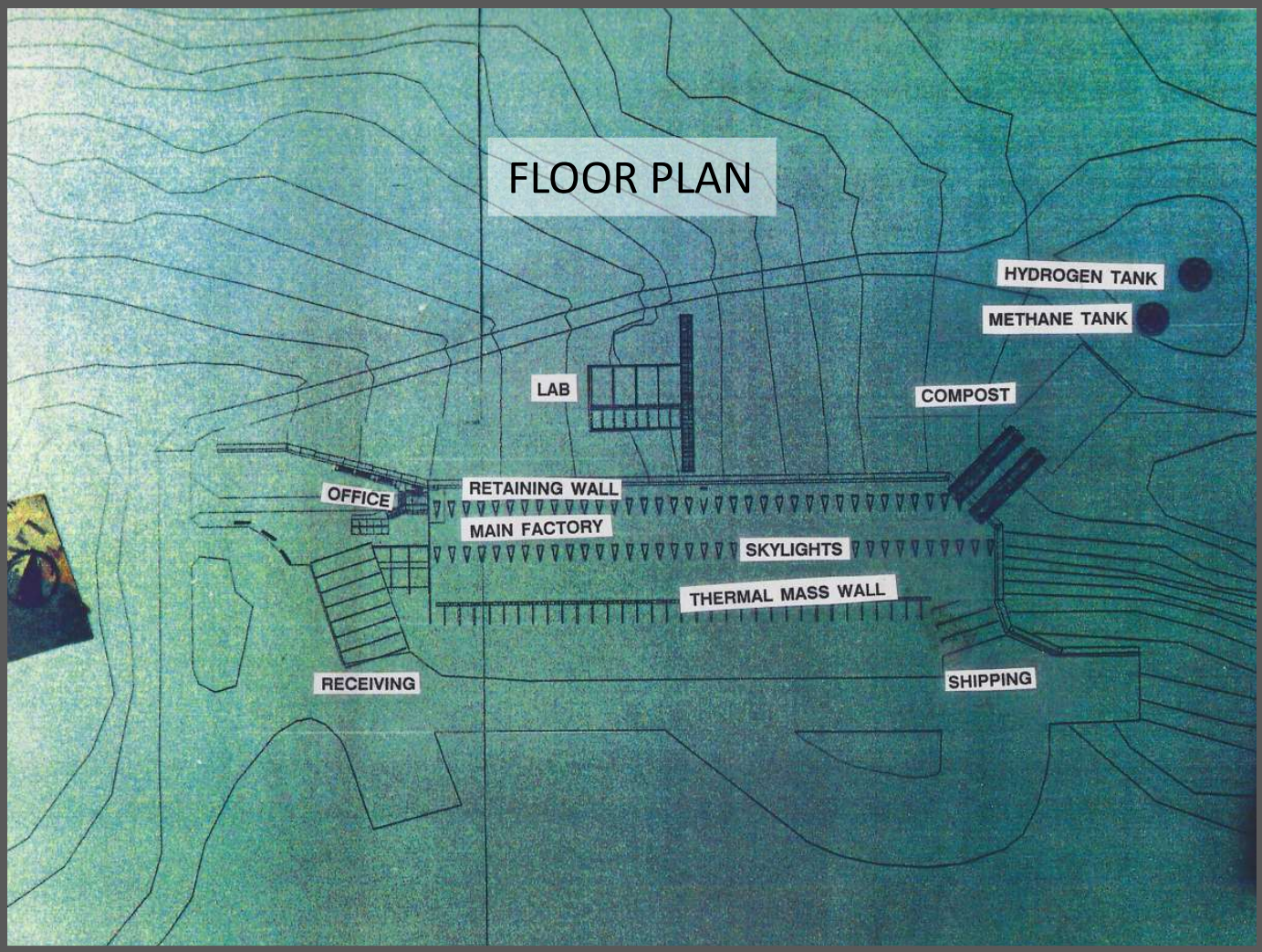
Experiments by Malcolm Wells and The New Alchemy group are concrete steps in learning how to architecturally reprogram man back into an additive, efficient cooperation with his environment, from which he has always tried to separate himself. We should enhance nature, not try to irresponsibly oppose or naively try to insulate or isolate ourselves from its processes.

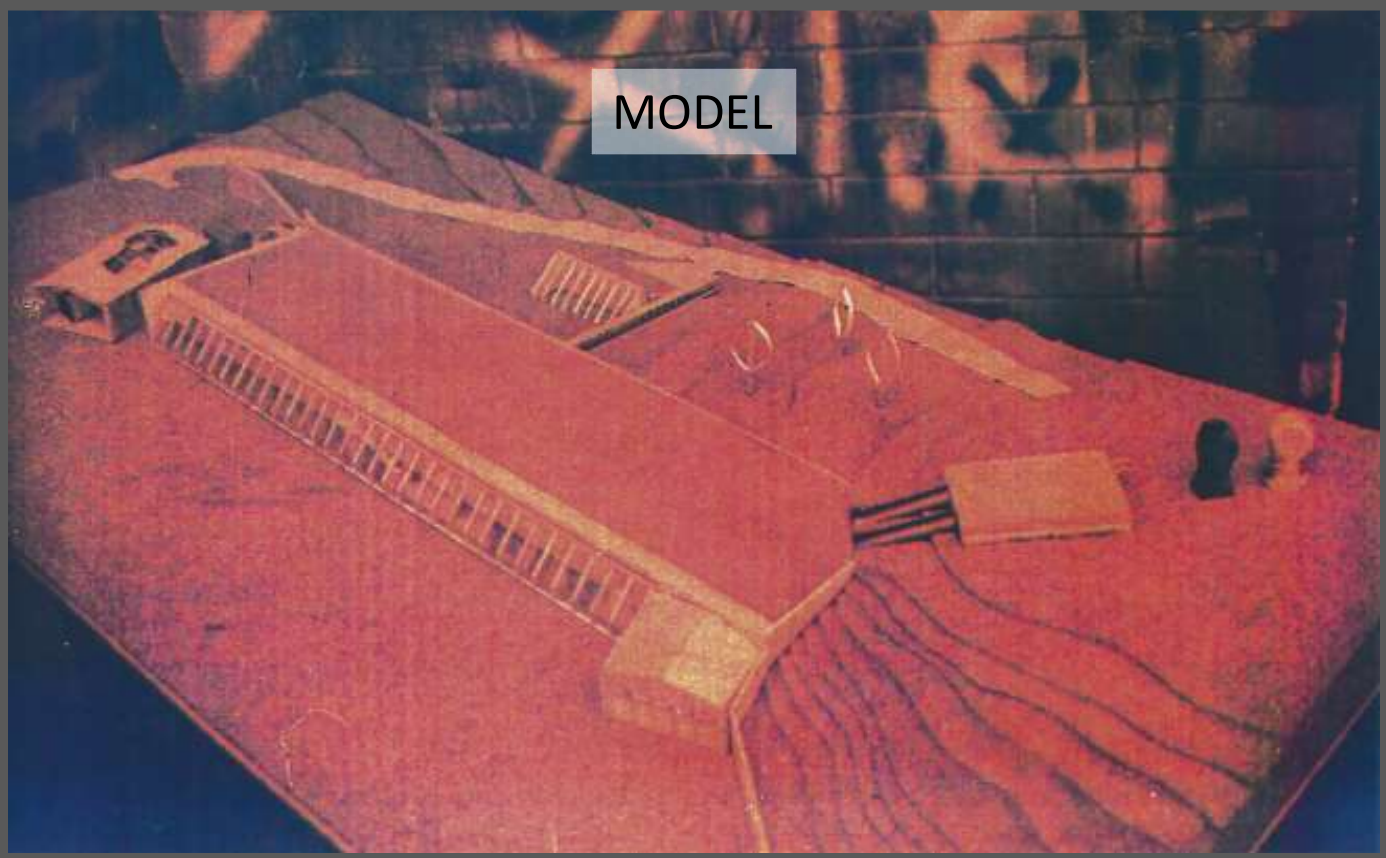
Architecture has always shown man's feeble attempts for limited control of nature. Unfortunately, active (non-passive) architecture, 99% of building today, attempts to separate itself and its occupants, from natural processes, by designing the building's process systems (H.V.A.C.) to aggressively compete in order to overcome those of its immediate environment. This is very expensive and is generating local and global repercussion which threaten even greater environmental and ultimately economic costs. It is only when the operations of a building and those of its environment (site), are optimally incorporated, that man maximizes limited control of nature, at the least economical environmental costs. Passive architecture uses its environment to the user's advantage– saving fuel, resources, and thus money. This can be achieved by not only <u>what</u> we choose to build, but also <u>how</u> we choose to build.

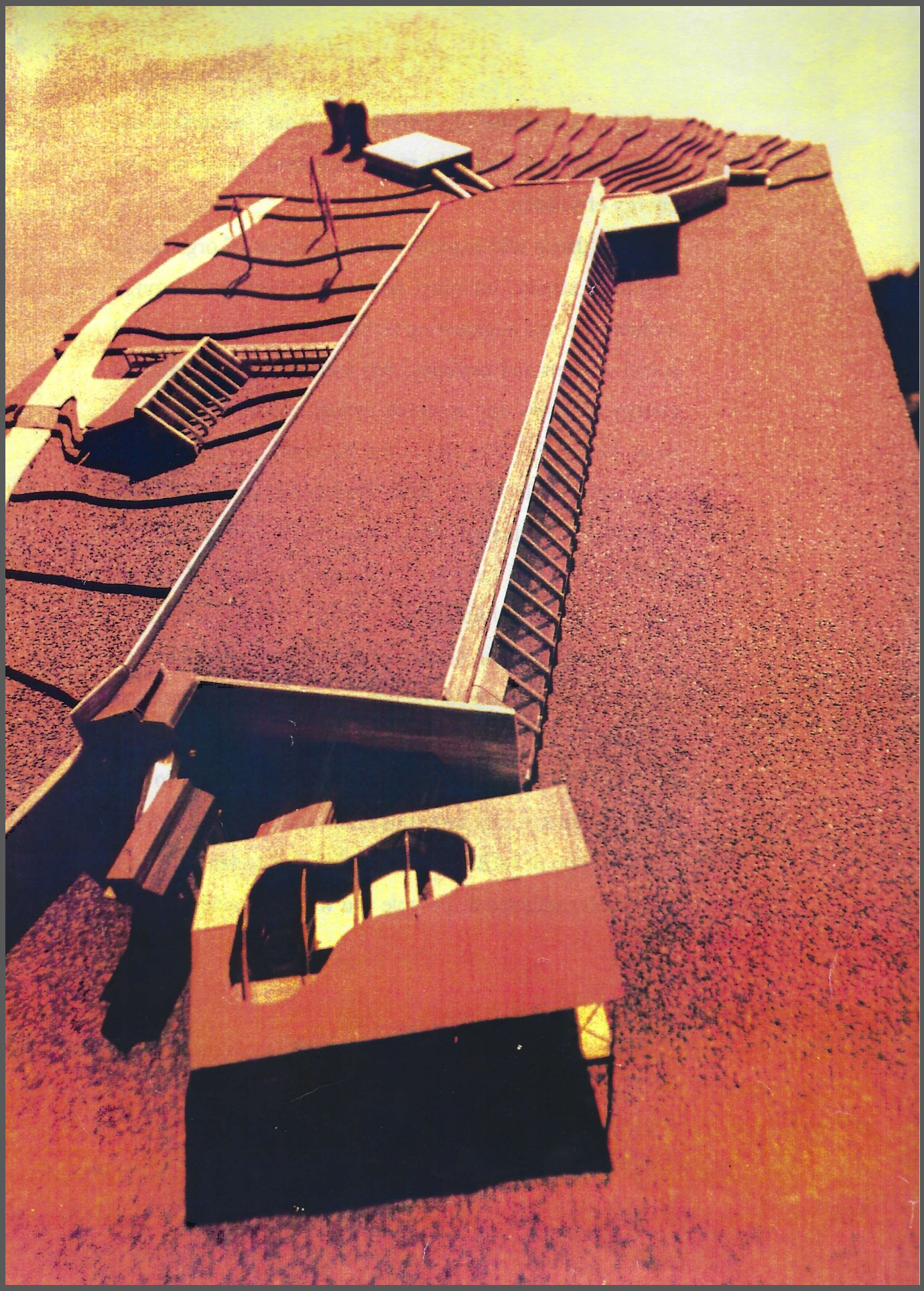
Architecture and engineering produce assemblages of technology that have serious effects and side-effects on

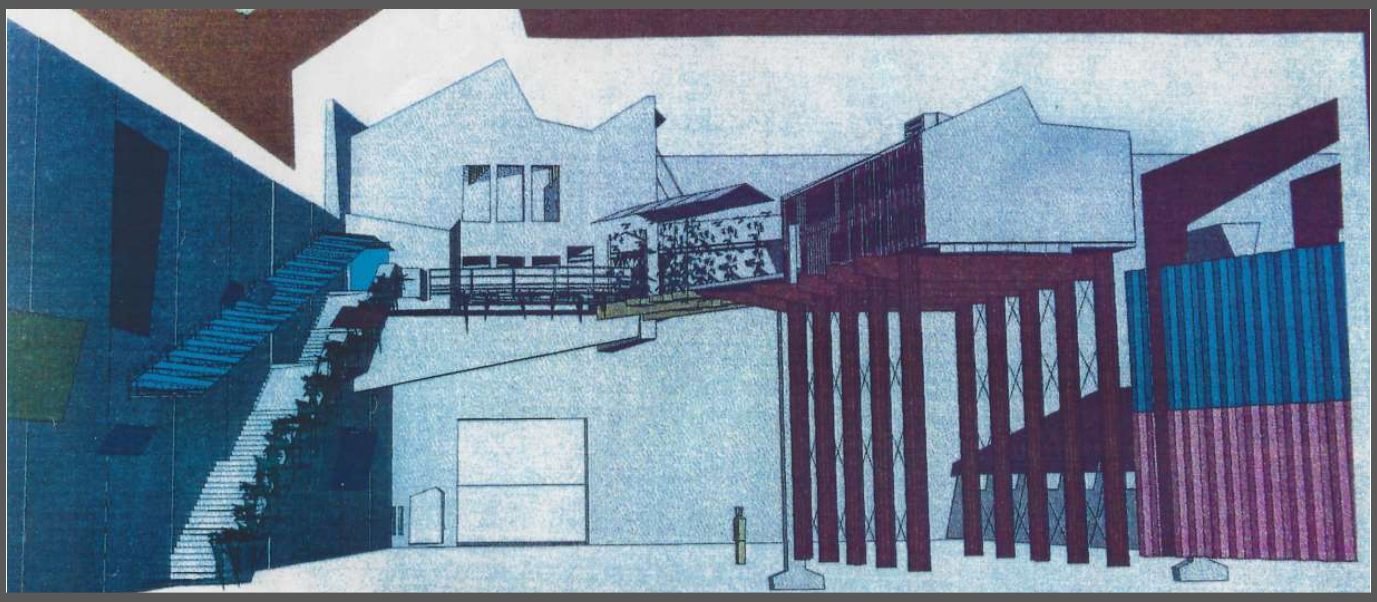
regional, national, and global environments. The finite, interwoven systems in which all organisms live, have limited sources, i.e. the supplies or resource bases, and sinks, i.e. the capacity to absorb wastes in the form of matter, trash, and energy. When either the sources or sinks are exhausted, the organism is doomed. Harmful, uncontrolled forms of growth, which can be seen as inefficiency and waste, must stop. Modern society and its architecture must adapt and succumb to a more sustainable global system and earth society.

Recycling can help close the gap between the haves and the have nots, helping to add to global stability. Although sociological resource use and waste is a problem with many causes, architecture and engineering can and should respond to environmental as well as appropriate social needs. At any rate, any past, present, or future structure that does not confine its own design to natural processes, indigenous environments, and human need, is inherently detrimental to man and earth.

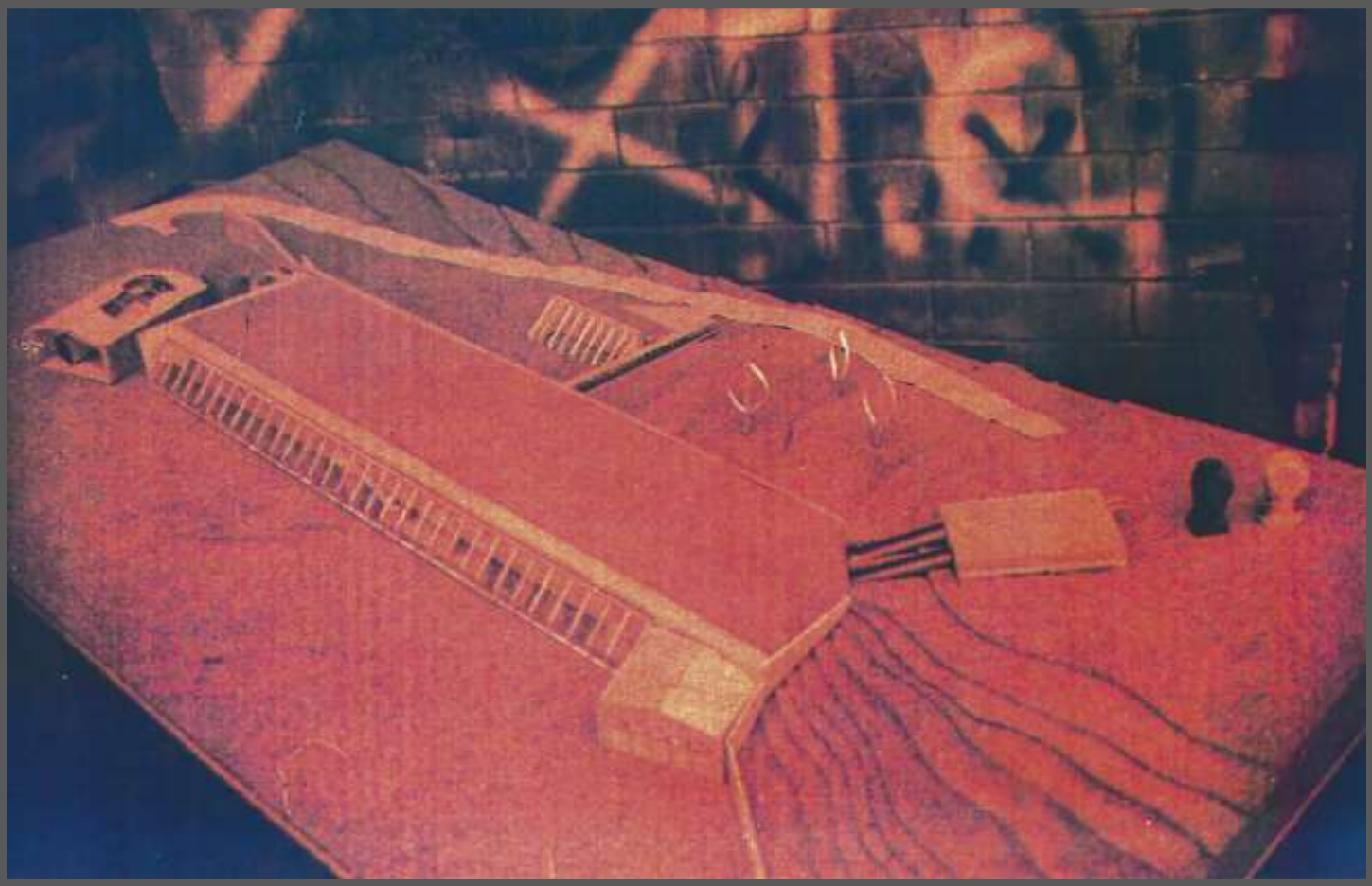

FLOOR PLAN
HYDROGEN TANK
METHANE TANK
LAB
COMPOST
OFFICE
RETAINING WALL
MAIN FACTORY
SKYLIGHTS
THERMAL MASS WALL
RECEIVING
SHIPPING


MODEL






Living
CLEANSERS: ONE STOOD OUT
PHOTO VOLTAIC PANELS
SOLAR SHADES
AQUATIC WATER PURIFICATION
KITCHEN DESIGI
FOR



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