Adaptive re-use of industrial site for urban agriculture, Pretoria, South Africa

Project data

- **Project group**: Building and civil engineering works
- **Client**: Virgin Foods
- **Project background research**: Adaptive re-use of industrial site for urban agriculture
- **Estimated start of construction**: Not applicable
- **Main author**: Calayde Aenis Davey, Master

Further author(s)

Not applicable

Comment of the Holcim Awards jury Africa Middle East

The jury commended this project because of its visionary idea and impact that appears both feasible and constructible. The utilization of abandoned industrial structures will become an increasingly relevant issue in societies that are transitioning to the tertiary sector.

Project description by author

There is a greater creativity to be found in this century when we explore the changing proximities of not only physical constructs of objects, distance and space, but also in meta-physical constructs - the human-driven global paradigms shifts in culture, lifestyle, technology and virtually. New fields are created for architecture when we understand and connect the proximities of objects of both cultural and bio-physical creation, and when we understand the ever-narrowing proximities between what has been and what is to come. The thesis explores and challenges this intangible, generating an architectural model for vertical hydroponic agriculture for the city of Pretoria, on the existing industrial heritage site of the Old Pretoria West Power Station. The project aims to aid in the development of a new productive urban building, productive urban landscape and ultimately a productive urban society for South Africa in the 21st century. The project illustrates that by drawing closer the proximities of food production and the urban environment; by developing the new role of architecture as producer; and by the re-use of industrial heritage, that architecture can generate a sustainable, resource-efficient, productive society by changing the current culture & perception of urban production. The project addresses the pressing issues of deindustrialisation, the adaptive re-use of industrial heritage, local food production strategies through urban agriculture; urban reform through productive landscapes; the role of architecture in changing 21st century lifestyles as it develops a productive urban society and finally, promoting true resource-efficient architectural design through the exploration and introduction of new building materials. The design generates a new perception and understanding of the value of industry within cities and the potential of industrial heritage to reform dilapidated urban conditions. Architecture can do this by closing the ever-narrowing proximities between a tradition of distant commercial agricultural landscape and the urban environment. By integrating industry with more intimate social, activities of the city, a closer relationship can be formed with between society and its production and consumption patterns, developing a new perception on the value of responsible, sustainable industrial processes and activities within the city. The project provides an opportunity for urban reform. This is done through vertical agriculture. By creating an architectural model for vertical urban agriculture, the new design also aims to replace the redundancy and alienating impact of outdated 20th century industrial technology with a new productive urban building and productive urban landscape. The project is proposed for the historic, industrial edge condition within the century old Pretoria West Power Station. The vertical farm caters for resource-efficient energy renewal by means of biogas production and rainwater harvesting. The entire existing water system, pumped from off-site source, is re-used for agricultural production. The entire existing structure, as well as existing industrial components and systems, are retrofitted to the needs of the new vertical farm and agriculture processes. The building produces a variety of products beyond food, in terms of compost, clean water and gas, and the biomass has the ability to produce substantial amounts of electricity via methane digesters. It is a viable solution for deindustrialisation and adaptive re-use of industrial building stock. The vertical farm employs over 300 people and aims not only to be a prototypical development for new local economic incentives in Gauteng via vertical and urban agriculture, but also illustrate the socio-economic value of urban and vertical agriculture to reform African urban environments.

Relevance to target issues by author

- **Innovation and transferability – Progress**
  Urban agriculture knowledge is transferred directly onto a local community. The design utilizes the entire scope and network of the urban environment as part of its sustainability strategies. Innovation is part of the physical construction technology as the project explores the limits of multi-story bamboo construction for commercial application as an alternative composite material. This is a solution that could drastically improve overall sustainability efforts for many medium-rise buildings. The technology is an easily transferable skill.

- **Ethical standards and social equity – People**
  A variety of opportunities for a highly skilled workforce, general factory workers or casual consumers allow inhabitants to form part of a new continuous productive city. A new street market forms part of the food factory and draws closer informal urban activities to formal industrial processes. The food factory blurs the lines of 20th century local urban inequity and aims to provide a hybrid mixed-use, productive green environment as point of departure for African urban reform.

- **Environmental quality and resource efficiency – Planet**
  The project is an adaptive re-use of an enormous existing, submerged coal bunker for agricultural production. It recycles 100% of grey-water production, collects 100% rainwater catchment and can be 100% percent naturally ventilated. The existing power station will close down within the next decade, and many existing resource loops will be broken unless this specific intervention occurs. The new food factory project re-uses the refined sewerage water, perfect for agricultural production. This existing resource system would have gone to waste as it would have ultimately been discharged directly into a local groundwater system and on-site ash is used in all the concrete construction products. The rehabilitation of the entire site in preparation for new developments provides a window of opportunity to grow alternative construction materials on site in the form of structural bamboo - a low-cost, extremely durable, high-strength structural material.

- **Economic performance and compatibility – Prosperity**
  The project introduces low-cost construction materials and employs over 300 people. Its numerous by-products (food, compost, gas, clean water) is extremely profitable and the a good return on investment is expected.

- **Contextual and aesthetic impact – Proficiency**
  The project introduces a new, cleaner, socially-oriented industrial building as part of aesthetic reform for de-industrialized urban cores.