A New Model For Food Production in the Stockholm Slaughterhouse District

Brian Faitt

Master of Architecture Diploma Project, Second Level 30 credits

Prof. Erik Stenberg, with Profs. Sara Grahn, Alexis Pontvik and Anders Wilhelmsson

With Examiners: Kia Larsdotter, Jonas Elding and Cecile Andersson

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The Slaughterhouse district in Stockholm, a century-old super-cluster located in the southern part of central core, is in the process of being developed into a mixed-use high-density housing area and is the perfect context to explore possibilities in the search for new models and relationships with regards to food production. Located within a somewhat removed and isolated portion of the city, the building site is located about 1.5 km from the district’s minor axis, moving from the southwest to northeast. The latter end of the site terminates at the new Arena and the former end at the only pedestrian entrance into the area from the southwestern side, into what is now a large truck navigation space among several large storage/refrigeration facilities.

In between these two points, the main axis of the Slaughterhouse district terminates into a train service yard whose distant edges form the semicircular boundary of the area’s elevated topology. As this portion of the site is south-eastward facing as well, the space would serve as a park or public gathering space.
Central Problem

We may not know in all cases where our food comes from, the processes or chemicals involved with their production, if the controls designed to safeguard public health will work every time (they don’t,) or if the underlying political/economic entities we support with our purchases are at odds with our moral, ethical views and even our health. Ultimately, in instances across the globe, actors with concerns contrary to the well being of society influence these systems for their own benefit and food production becomes a black box. Recent examples include the following:

- Salmonella in agricultural products.
- E-Coli and bacterial outbreaks
- Proliferation of numerous diseases and vectors:
  - Mad Cow/Creutzfeldt-Jakob Disease
  - Bird flu, H5N1 and similar variants
  - Foot and Mouth Disease
  - Swine flu, H1N1 and similar variants
  - Foot and Mouth Disease
  - Bird flu, H5N1
  - Swine flu, H1N1
  - Mad Cow/Creutzfeldt-Jakob Disease
  - Food company

Constant bacterial outbreaks of E-Coli and Salmonella in agricultural products.

Pesticides, antibiotics, growth hormones, carcinogens and other chemical contaminants that have been linked to disorders, diseases and genetic mutations.

Concept Development

As a result of choosing a long site, the idea arose to explore the building in section across its length. As a starting point, sections from a successful housing project and one from one of the smaller food distribution companies were examined.

Beginning with one of the typical small-scale food distribution companies found on this site, a two story structure containing inventory and a shipping/receiving port at its lower level with clerical functions above were divided. Distribution functions were placed underground, removed from expected pedestrian flows, and a market was placed in-between the two spaces to serve the future area. Its inventory would be stocked/ shared from the company’s supplies.

Eventually both were merged, as opposed to being stacked upon one another, as to create the possibility for interaction.

Concept

To explore the possibility of creating a mixed use building in an urban context that allows the occupants to produce and oversee food production through technological systems built into the facade of a structure which would allow the occupants to move towards self sufficiency, as opposed to relying entirely on mainstream commercial food sources.

I have envisioned a double leaf wall envelope and roof systems functioning as greenhouses in order to contain fruit and vegetable production supported by a hydronic system somewhat similar to those found in industrial greenhouses. Various technologies relating to photovoltaics, active and passive solar energy, natural and forced ventilation and rain water retention would be integrated into their design.

Meadow uses spaces in order to strengthen the concept would include:

- Ecological Store/Market
- Ecological Cafes or/and Restaurants
- An Urban Greenhouse
- An Urban Plant Nursery
- A Sustainability Center
- Social Community Spaces

A Store or New Market Prototype (Alternative model for food production)

The public/street level of a new structure would contain a food market comprised of companies from the food industries currently residing in the Stockholm Slaughterhouse district (primarily meat but also vegetable distributors) which would be kept open through the expected redevelopment of the area into high-density housing.

This market would function as both a storage and distribution depot for those companies distributing to the larger Stockholm metropolitan area, as is currently practiced, and be open to the general public as a type of grocery store or farmers market with the possibility of expanding some portion of the market’s activities outdoors during harvest times and in times of good weather. (Think Street’s Hornstull’s Bonodora Egen Marknad, the original Central Market in Austin, something along the lines of an IKEA for food.)

The size of the distribution activity would be intended to be limited in scale as to not incorporate large trucks and the necessary large infrastructural area required for their operation and would operate on a level removed from the normal flows of pedestrian traffic, connected to underground levels and parking.

A co-op, or another form of joint commercial venture, would be formed where occupants/residents residing in the building’s assume some operational control over the choices of food bought/sold/distributed by entities function in the commercial spaces with the intention of making the best choices pertaining to various criteria such as local/distant sources, organic/chemical fertilizers/pesticides, sustainability, health value, ethical choices, etc.

The residents in the building would have the option of selling their produce in the market as well, or to each other. Through a transport system incorporated into the facade system that would enable the possibility of new networking interactions between occupants and those who would share, barter and communicate with one another—perhaps make each other over for dinner, or, simply, send dinner over in return for dinner later, cash, or, something else. (Think book transport system at Asplund’s bibliotek, Stina’s matkasse, dumbwaiters connected to a kitchen or restaurant and the idea in America where the kitchen area has become the social meeting place for the household, now to take place in a dense urban setting among many households.)
What is the best angle to see them?

View of greenery coming down into main passage

Residential entrance from street

Poss more parking

Poss pool

Storage/laundry

Commercial/retail

Market

Extending Streets

Poss lower roof height

Entrance from street

Entrance from parking garage

Extend the walking plane of the street into the market so that it feels seamless.

Perhaps the street and the building can exchange in widths such that one is bigger, say for street life, then the other becomes larger to become part of the street, then the space goes to the southern part near the park.

Amnesty and Social interest groups related to food issues.

Integrated bodies across stores

Secondary store

Secondary store

Secondary store

Secondary store

Integrated bodies

Housing

Food Business

Market

Connected bodies

Precincts

Services

Flow air/water

CO2

O2

Rainwater

Graywater

Waste

Greenhouse

Playground

5m greenhouse

greenhouse as skylight

lightshaft

shipping/receiving

see trucks loading and unloading.
Primary shipping/receiving transport will be carried out through medium-sized transport trucks which would primarily enter the building from the northeastern end of the structure via close streets adjacent to major thoroughfares about this same side.

A shared entrance for all traffic leading into the parking area of the building would be separated into 3 zones:

- Minor access would take place at the opposite end of the structure about the southwestern side of the parking structure.
- S/R activity would be carried out along the length of the structure, relatively beneath the companies of functions supported.
- Minor S/R activity will also take place at intervals about several vertical lifts along the main axis of the parking structure which would primarily serve as access to public/commercial/retail levels but would also be used by the inhabitants of the structure. The northeastern face could also be used for minor S/R functions as well.

Larger trucks entering the building will be able to enter at the northeastern entrance of the parking garage from the streets adjacent to the main entrance as well, but only two docking ports will be provided for service.

All vehicles have the option to exit at either side of the structure, except for large trucks which exit at the southwestern part of the parking structure.

Building Services and Support

Access to functions such as waste removal, collection of recycling content, service repairs for aspects such as plumbing and air conditioning, will take place at the public level of the parking structure in the same zone as other medium S/R excluding the immediate area around the main dock.

Flow of People into and in the Building

Primary flows (customers) need to be lengthwise to the building.

About the market, flows can be pushed closer to the southern windows. Or, alternatively, a separation can be made regarding the vertical access which had been two separate systems in one construction. Now it would be separated allowing the private occupants street-side access and market functions ones closer to the southern facing side and according to the frequency they are needed.

The street facade, with retractible window/doors, could allow a changing opening/entrance setting.

The primary flow along the length of the building would be change in elevations in a few places which would be carried out by escalators or conveyance systems in the center of the concourse to allow views across the space.

Customers/General Public Access

The main points of access for entry into the building will occur along the street for those coming via foot, bike, bus, train or tram.

Vehicular traffic will enter the parking structure at the northeastern entrance and have the ability to park their car from the point of entry until the area about the dock to the western portion of the parking structure.

Access into the building will take place through the vertical lifts positioned intermittently along the main axis of the parking structure.

Assuming that there will be vacant parking spaces in the evening when some shops have closed, parking would be available for those attending events at the new arena adjacent to the building.

Workers in service shops

Those working in the building will have the option of parking in reserved parking spaces in either a public or private location in the parking garage, but will be recommended to use public transport to come to the workplace.
What is the best angle to see them?

5m
Hydroponic system

- Types: food producing
- Seedings/need screens for light control
- Also for auto-watering houseplants
- In containers
- In tanks
  - Fed by water outlet
  - Controlled by
  - Drained through tubes in supports or floor
  - Lamps provide additional light (heat in cavity)

Double Leaf/PV facade system

- Two lights are set up in an internal space, creating a strong thermal barrier from the outside climate. The outermost light is fixed with a transparent photovoltaic film on the inside surface, while the inside lights consist of sliding glass doors.
- Floor to ceiling glass allows for maximum daylighting and solar gain into the interior space, which can be controlled by an automated blind system built into the cavity of the sliding door.
- Transparent photovoltaic film from MIT or Fasadglas

Wall System Diagrams

Wall System Perspective
Active Heating
- Hydroponic water system stabilizes heat within cavity.
- LED lights provide heat.

Passive Heating
- Sunlight passes through system to be absorbed into floor.
- Plants in cavity absorb heat and transfer it into energy for plant growth.
- Cavity controlled by both blinds and sensor-controlled ventilation.

Exhaust Ventilation

Intake Ventilation

Short Section
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