
FARMING
SUBURBIA
COMMUNITY COMPANY
A THESIS BY TONY DI DONATO - MAY 2013
STOP

TOPIC PROPOSAL OUTLINE – SUBMITTED: MAY 10TH, 2010

Note: This document is for record of submission puposes only. The statement below has been updated. Please refer to the Thesis Statement on page 74.

STATEMENT

Architecture must paradoxically be both transformative and enduring to ensure the sustainability of our communities and cities. My topic of interest is Urban Farming. As the economic pressures of peak oil reduce the economic viability of shipping food and manufactured goods over great distances, more and more food will need to be produced locally – even within our cities. The pressure to re-localize the key functions of food production will affect how our cities are planned and operated in the future. Currently more than fifty percent of the world's population is living in cities, (Alter Lloyd, Azure Magazine, May 2010) which gives reason to ask if our food can be generated within the cities themselves.

METHODOLOGY

Prior to the selection of site and program, research on current urban farming strategies will be conducted. This research will also investigate urban design and architectural strategies not simply for the food production required to feed cities and their suburbs, but the possibilities of diet, agriculture, and retrofitted facilities within the constraints of the local climate. A number of case studies will be researched and visited on the international, national and local scales as required. The conclusions drawn from this research will aid in the program and design development portion of the thesis.

LITERATURE SEARCH

The subject of Urban Farming will require examining large scale and small scale projects, with the use of historical books, periodicals, monogram books of various architects/firms and the Internet. Also, another perspective at the subject matter will be investigated by the use of current official documents, government reports, and studies available at the city's urban design library. When possible, research will be obtained through personal interviews with local architects, engineers and planners who have direct experience or knowledge of local precedents.

THESIS COMMITTEE

RAIC Syllabus: D9A Thesis Research
Tony Di Donato #ON030006Tor

THESIS COORDINATOR(s):
IVAN MARTINOVIC, Architect
MARIUSZ GONTARZ, Architect
DEBBIE FRIESEN, Architect

SYLLABUS MENTOR: ROBERT BOYD, Architect
ADVISOR: JAVIER ZELLER, Architect

TONY DI DONATO

Tony Di Donato earned his Bachelor of Architectural Science from Ryerson University in 2002. He has been enrolled in the RAIC Syllabus Program since 2003. For his thesis, Tony is drawing upon his experience of growing up in Burlington, Ontario with Italian immigrant parents who provided their household with vegetation grown in their own backyard. Tony is currently living in Richmond Hill, Ontario with his wife and son. Life experiences in the suburbs of the GTA have inspired an academic exploration involving architecture and agriculture for future generations.

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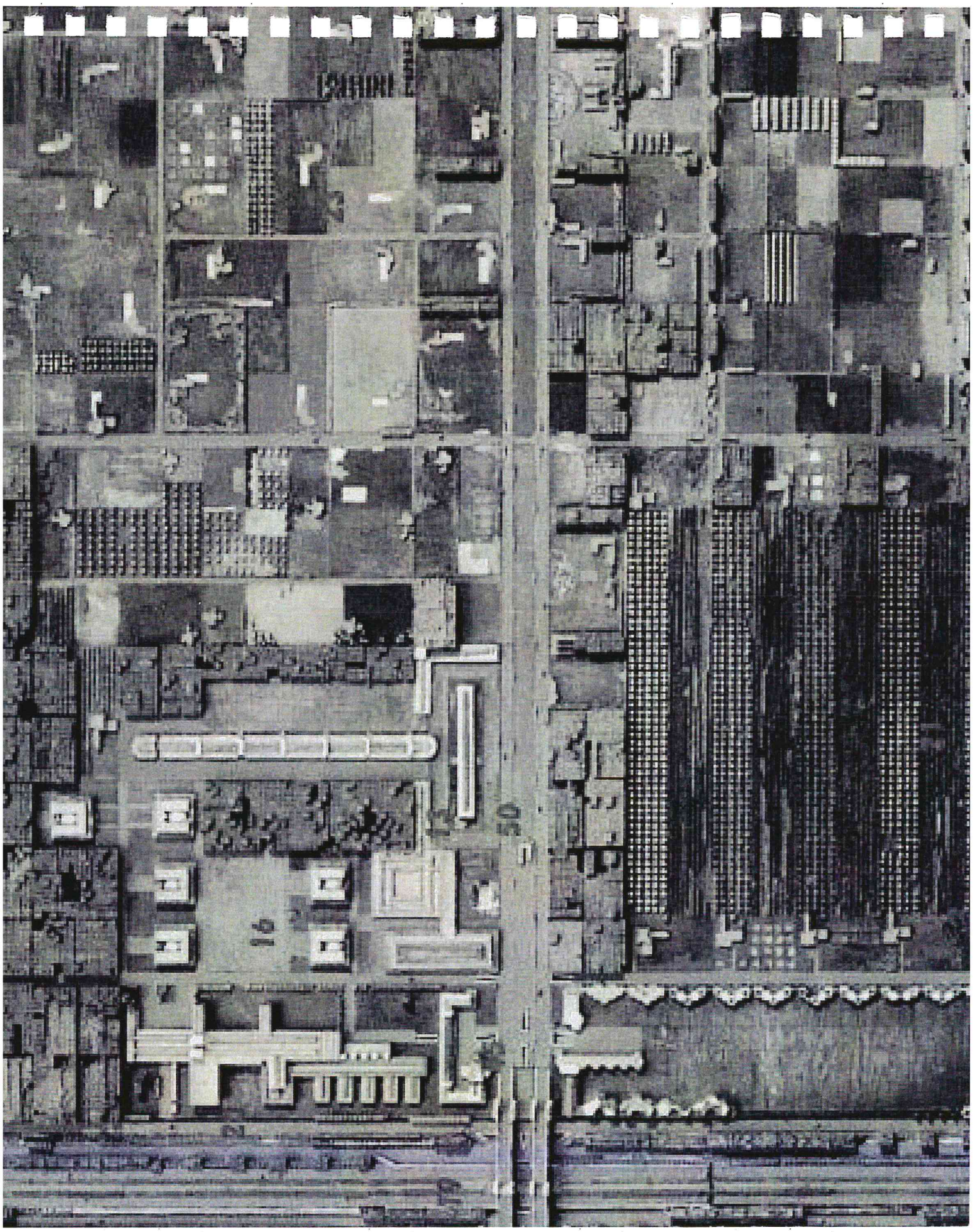
INTRODUCTION - The Vision of A Local Food System

The purpose of a local food system is to guide the creation and maintenance of a sustainable, integrated means of food production, processing, distribution, marketing, consumption and waste management—all in a suburban landscape. A local food system integrates life, work, and play in an environment that also produces food for healthy, sustainable community growth. An integrated infrastructure can be created through managed development of roads, railroad lines, municipal utilities, walking and biking trails, and bike commuter lanes. Creating and developing a local food production infrastructure connects with these other systems and provides the foundation for sustainable growth.

The success of a local food system depends upon coordinated infrastructure elements that utilize and share resources. A transportation system needs to support the distribution of both products and people in a suburban landscape. Institutional and community food processing activities must be consistent and aligned, whether implemented at or by schools, churches, agencies, and governments. Food production must be integrated into the daily activities of all community residents whether through individual actions, recreational or communal gatherings. Positive personal development can be achieved by integrating food production into community recreation parks, as in shared urban gardens. Effective marketing must be a link between urban food producers and consumers. Through encouragement of cooperative market outlets, a larger number of food access points can be created to supply healthy fresh and affordable food, "close to home". Finally a sustainable community is an ongoing, self-perpetuating system. Waste management is part of any local food system that must be integrated with existing waste handling, recycling and reuse programs in a community.

A well-planned, effective local food system means a healthy, sustainable growing community, that is economically, environmentally and, most importantly, socially viable.

CHAPTER 1.0: PERSPECTIVE(S)



1.1 AGRARIAN LIFE

Many 20th-century urban planning projects aspired to construct an agrarian urbanism — in some cases to reconcile the seemingly contradictory impulses of the industrial metropolis with the social and cultural conditions of agrarian settlement. In many of these projects, agrarianism offered a counterpoint to the increasingly dense metropolises that grew with the great migrations from farm villages to industrial cities in the 19th and early 20th centuries, especially in Western Europe and North America.

- CHARLES WALDHEIM

SOURCE: Plan view of the Broadacre City Project. Wright, Frank Lloyd - Architecture: Man in Possession of his Earth (p.119)

1.1 AGRARIAN LIFE

At the end of the Stone Age, and coincidental to a significant warming of the Earth's climate, human societies began to shift from hunting and gathering to the domestication of edible plants and animals – an event known as the Neolithic Revolution.

According to the current state of anthropological research, the Fertile Crescent (present day Iraq, Syria et al), China, Mesoamerica, and New Guinea emerged as the primary centres of agricultural development between 10,000-8,000 BC, followed by South America and North America in the succeeding millennia. Together, these six regions proceeded to domesticate the majority of agricultural products used throughout the world today. Wheat, barley, and lentils were developed from wild plants in the Fertile Crescent; rice, soybeans, and cabbage in China; squash, corn, and beans in Mesoamerica; potatoes, peppers, and pineapples in South America, to name just a few. Those areas where agriculture took longer to appear, such as Australia, Southern Africa, and southern South America never saw local species evolve into agricultural varieties.[1]

It is impossible to overstate the significance of agriculture's emergence, both in terms of its affect

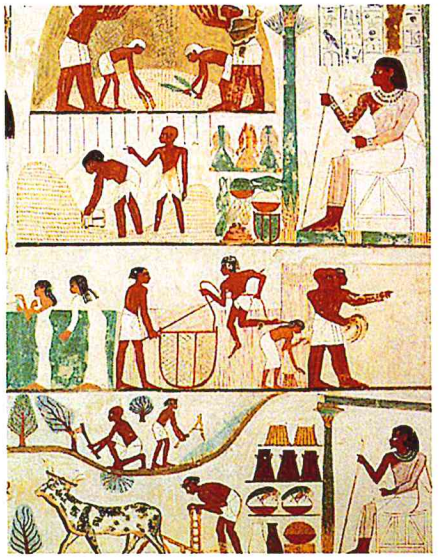


Figure 1: A tomb relief depicts workers plowing the fields, harvesting the crops, and threshing the grain under the direction of an overseer. Cabwinsaw, R. – Ancient Egypt, 2007

1 Diamond, Jared. Guns, Germs, and Steel, 1997

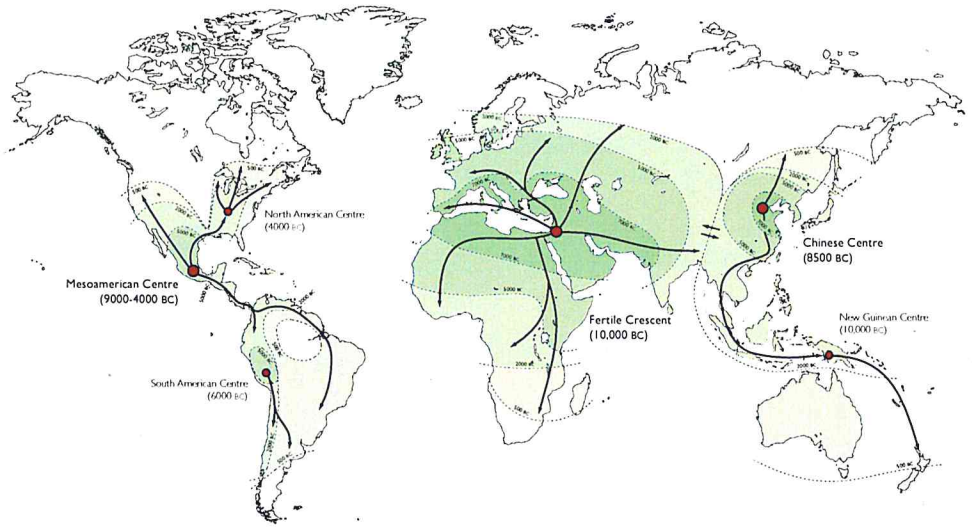


Figure 2: Map of Neolithic agricultural revolution, Centres of origin and areas of extension of the Neolithic agricultural revolution

on the human species and on the biosphere as a whole. The cultural, intellectual, and behavioural disposition of nearly every human on Earth is a direct product of the agrarian lifestyle. So too is humanity's newfound capacity to derail the stability of the natural world. In his book *Feed or Feedback*, microbiologist A. Duncan Brown went so far as to state that the emergence of agriculture was second only to the accumulation of elementary oxygen in the atmosphere in terms of its affect on the development of the Earth's environment and ecology.[2]

To fully understand the extent to which agriculture impacted human society, one must address the fundamental difference of resource utilization between hunter-gatherer societies and agrarian communities. Since hunter-gatherer diets were a product of the natural availability of food in their environment, their survival was directly tied to the biodiversity of their environment. If a particular band of hunter-gatherers were to stalk the edible animals or pick the edible plants of their region into scarcity they would be forced to relocate to a more favourable environment, giving the over-consumed ecosystem time to re-establish.

With the arrival of agriculture, humans discovered more food could be obtained by converting natural ecosystems into farms than by relocating to another region. This eroded the systemic deterrent to the destruction of natural ecosystems and installed in humanity an incentive for unbridled consumption of the Earth's material resources.

2 Brown, Duncan. Feed or Feedback, 2003

By clearing ecosystems that catered to a wide diversity of species and re-populating them with plants and animals geared solely for human consumption, we greatly increased our share of food energy available from the environment. In this way humanity circumvented the most important limiting factor controlling our species – the availability of food – creating an imbalance between our instinctual drive to reproduce and our ecosystem's ability to control us. As a result, the established negative feedback relationship that existed between humanity's food supply and its population growth shifted into a positive feedback cycle. That is to say, while hunter-gatherer populations were confined by the limitations of the natural availability of food, the expandable food yields of agriculture allowed agrarian populations to increase at an exponential rate. As Jared Diamond explains,

> *[The] gradual rise in population densities impelled people to obtain more food by rewarding those who unconsciously took steps toward producing it. Once people began to produce food and become sedentary, they could shorten the birth spacing and produce still more people, requiring still more food."*[3]

3 Diamond, Jared. Guns, Germs, and Steel, 1997

It is also important to state that the emergence of agriculture made our own ingenuity the only limiting factor on our means of sustenance. The natural limits and restrictions enforced by our environment became much less significant. As a result, the success of any particular society became less a product of its biological fitness and more a product of its 'memetic fitness'. Coined by Richard Dawkins in *The Selfish Gene*, a "meme" is the cultural analogue to a biological gene that "conveys the idea of a unit of cultural transmission, or a unit of imitation", such as communicable knowledge or technology.[4] Memetic fitness, in turn, is analogous to the concept of genetic fitness that quantifies the capability to successfully reproduce.

Those societies that displayed the most efficient resource-collecting techniques were also those most able to reproduce successfully – leading to the greater dissemination of the most advantageous memes. Agriculture offered a supreme competitive advantage over other forms of resource-collecting that ensured its proliferation and, as a technology, it could be improved to offer still greater advantages to a society. Thus the emergence of agriculture became a major determinant of human action.

4 Dawkins, Richard. 1989, "11. Memes: the new replicators", The Selfish Gene (2nd ed., new ed ed.), Oxford: Oxford University Press, pp. 368

1.2 VISIONS: AGRICULTURAL URBANISM

The following section summarizes three architectural visions. The projects, some utopian visions and some unrealized imaginings, are all united by the underlying thread of developing self-sustaining societies by connecting the built environment with agricultural production.

SOURCE: Community Garden Plots, Boston, Massachusetts, © 2010 Alex S. MacLean/Landslides

1.2 VISIONS: AGRICULTURAL URBANISM

BROADACRES - 1932
Frank Lloyd Wright

Broadacres was Wright's vision for a utopian America that would sprawl across the nation, providing each citizen with at least one tillable acre of land within their single family household. The plan is centered on an idealized combination of mechanized mobility and the homestead archetype.

Wright foresaw that developments in automobiles and the highway system meant individuals would no longer be limited in their range of travel. The country could become a continuously gridded and settled 'city' that would be fundamentally agrarian. A continuous city, Broadacres would have designated service areas, grouped by function, located at major arterial hubs. Each homeowner was to use their allotted land for agricultural or leisure purposes.

Decentralization was at the core of his proposal, where each individual would be partially if not wholly responsible for their own self-sufficiency. Agriculture would be the basis for developing a new social and economic structure; a structure that agriculture and industry could and would develop hand in hand.

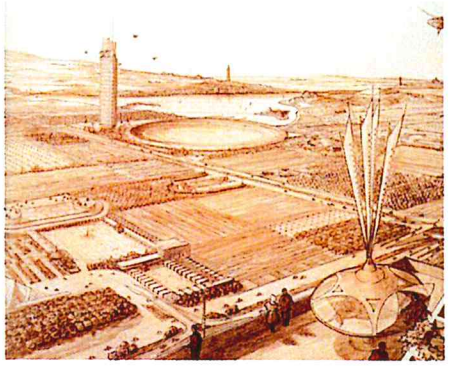


Figure 3. Broadacres - Aerial Perspective. Wright, Frank Lloyd - Frank Lloyd Wright and the Living City (p.43)

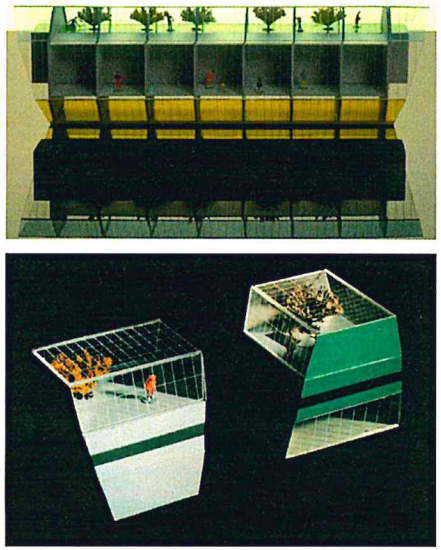


Figure 4-5: City Fruitful physical models, 700 dwellings and 22 hectares of cultivation under glass adding up to 56 hectares altogether. City Fruitful, Kuiper Compagnons, Kas Oosterhuis Architekten et al., 1992

CITY FRUITFUL – 1992
Kuiper Compagnons, Kas Oosterhuis Architekten et al.

The agri-industry is one of the largest industries in the Netherlands. Sizeable greenhouse-complexes take up a large part of the densely populated west of the country. At the same time this zone is subject to an ongoing urbanization process and is therefore densely populated. Municipalities are literally fighting over space for housing. The project 'City Fruitful', planned for an area near Dordrecht, illustrates that a lot of space and ecological efficiency can be gained by radically mixing two purposes. The project was created by a group of city planners, architects, market gardeners and technicians. Borderlines between different kinds of use appear to be counter-productive.

City Fruitful is a combination of about 1700 dwellings and 22 hectares of cultivation under glass, adding up to 56 hectares altogether. Homes are situated not just next to, but also beneath and on top of greenhouses. Energy, water and waste cycles are closed. Houses have the same air quality control systems as greenhouses, with automatic control of vents and blinds. The roof surface of greenhouses is ideal for passive solar energy generation. Transportation systems are shared between habitation and production.

Most of the city, however, is car-free. There is one main road. Walkers, users of public transportation and cyclists are well off because of the fine-meshed infrastructure. Area use would be about one and a half times greater than in today's average urban situation.

There is also enhanced quality of both production and living environments. The scheme unfolds a new greenhouse typology in which greenhouses can be part private conservatory, part public winter garden or atrium. Home building and agriculture are both energy intensive functions that can profit from each other's presence, because of the mutual transfer of excess warmth energy. At the same time, the greenhouses are ideal for the passive use of sun-energy. Unfortunately City Fruitful has remained a schematic study project only. At this moment the housing shortage is being dealt with less creative ways.

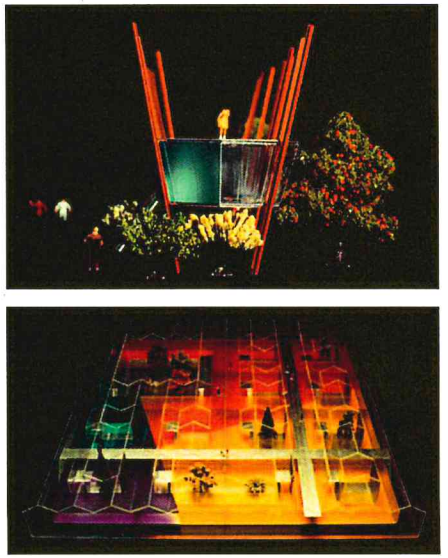


Figure 6-7: City Fruitful physical models, 700 dwellings and 22 hectares of cultivation under glass adding up to 56 hectares altogether. City Fruitful, Kuiper Compagnons, Kas Oosterhuis Architekten et al., 1992

Figure 8.9: Diagrammatic aerial view of urban voids interwoven with agricultural patchwork. Front Studio

FARMADELPHIA - 2006
Front Studio

"FARMADELPHIA proposes to transform the urban environment by introducing bucolic farmlands into the city's urban fabric. Farmadelphia adopts the extensive sprawl of overgrown lots and vacant buildings as a source of inspiration while it fortifies and reinforces the ongoing green legacy of Philadelphia. The insertion of incongruous rural elements assigns a new use for the abandoned parcels, creating juxtaposition between farm and city that challenges its residents to revitalize their surroundings and daily lives. The conversion of vacant lots into farmlands not only provides employment in the industry of agriculture but also empowers residents to take charge of their lives and their land. Each block maintains responsibility for its own farm harvest, encouraging entrepreneurship throughout the larger community as block owners vie to sell their goods to regional specialty restaurants and shops. The creation of localized centers of activity, each related to a specific crop or harvest promotes small town relationships while strengthening an overall sense of pride and commitment in the community. The cultivation of local gardens provides an opportunity for residents to access fresh and nutritious food. The 'Farmadeliphication' of once decrepit buildings into farm structures advances fresh ways of seeing old structures as well as allowing for an organic transformation of history that contributes to the present day fabric. The irony of the farm and the city ceases to be a paradox as both function as one integral machine, combining the pleasure of open sky and land with the richness of city living." - FRONT STUDIO

1.3 FARMING THE LAND

"Creativity involves breaking out of established patterns in order to look at things in different way."

– EDWARD DE BONO

SOURCE: Community Garden Plots, Santa Monica, California, © 2010 Alex S. MacLean/Landslides

1.3 FARMING THE LAND

Using high-cost, high-value urban land for food production is a challenge, given dominant urban planning and real estate practices.

Ideally, land used for food cultivation should be fertile and free of contaminants. In addition, it should be close to both input supplies and markets, and should not reduce biodiversity. Food production should fit well into the neighbourhood to sustain positive relations with neighbours, while including elements that minimize theft and vandalism.

Despite the challenges, interest in urban agriculture is increasing, as reflected in several studies under way. Researchers at Ryerson University, Toronto, are researching green spaces in the city. The City of Toronto Environment Office is examining underutilized and oddly shaped land parcels that could be converted to community gardens. Several governmental and para-governmental agencies, including the Toronto District School Board, have expressed interest in conducting internal assessments of underused or surplus land holdings. The Ontario Realty Corporation is studying provincially-owned land in the Greater Toronto Area that can be placed in agriculture. The re-localization of agriculture can be as simple as a backyard or front-yard garden for those who have the space, and the allotment of public community gardens for those who don't. The following suburban farming production strategies are discussed as an overview of the possibilities.

Figure 10: Postwar suburbs have another untapped resource: parking lots, with roughly three parking spaces, or 60 square metres, for every person. Covering hectares of land with asphalt to temporarily store cars was considered a more lucrative use than agriculture, but this may change as horizontal real estate with direct sunlight becomes more sought after for food or energy production. The Cliffside Plaza proposal – by Ryerson University, Toronto students illustrates a suburban strip mall transformed into an edible landscape. Parking and a principal axis are relocated below grade to create a public realm between the commercial and residential buildings. Extensive plantings, food gardens, greenhouses and even rooftop poultry farm are envisaged in this plan that aims for renewal rather than replacement of a typical suburban condition.
– www.greenroofs.org

FARMING THE COMMUNITY

Urban agriculture may take root first in the suburbs, as residential communities begin to rethink how they use the land around their homes. Community gardens, also known as community-supported agriculture (CSA), are usually located on public land and are devoted primarily to the growing of vegetables and soft fruits, although hard fruit, flowers and herbs are also grown in many community gardens. They are usually managed by a non-profit association and may have individual plots of land that can be rented on an annual basis for a small fee, as well as larger growing spaces that are collectively tended. Community gardens have a long history in many parts of the world and are also known as allotment gardens and Victory gardens because of their role in growing food vital to the war effort during WWI and II.

Postwar suburbs have another untapped resource: parking lots, with roughly three parking spaces, or 60 square metres, for every person. Covering hectares of land with asphalt to temporarily store cars was considered a more lucrative use than agriculture, but this may change as horizontal real estate with direct sunlight becomes more sought after for food or energy production.[1]

1 Alter, Llyod. Azure Magazine, 2010

Many people use gardens to supplement their diets with nutritious, fresh produce as well as save money on groceries. In addition, community gardening provides an opportunity for healthy, outdoor recreation in a social setting. Many community gardeners develop friendships, since the nature of gardening lends itself to the sharing of information, tools, seeds, plants and stories. Community gardening can therefore be seen as a community development tool as well as a way of improving food security.

Community gardens are an effective, low cost means of animating public open space. They are the site of countless "over the garden fence" interactions between gardeners and non-gardeners alike. Community gardens offer the unique opportunity for citizens to experience links to our agrarian past, directly and indirectly. Often seniors, who have spent some parts of their lives working the land, find satisfaction in seeing people grow food or taking an active hand in growing it themselves. Community gardens provide outdoor learning laboratories for school children and others interested in the biology of food and habitats.

In these ways, community gardens offer social and environmental benefits that often outstrip the economic benefits that result from production of personal foodstuffs. One study showed that community gardeners were more likely to regard their neighbours as friendly and were also more likely to get involved in neighbourhood clean-ups, beautification projects, and local barbecues. By comparing responses to questions on psycho-social well-being to controls, the study also showed that urban gardeners found life marginally more satisfying than non-gardeners. [2]

Figure 11: Detroit is one of the few urban areas in North America with large expanses of land available for urban farming. 900 community gardens presently operate within the city limits. But it's set to become home to the biggest urban farm in the world when former financier John Hantz moves forward with his 20-hectare pilot project this spring. His larger plan to convert over 20,000 hectares of vacant city land into productive farms has drawn criticism surrounding private versus public ownership of land dedicated to such a massive initiative. - hantzfarmsdetroit.com

2 Blair. et al, 1991

Figure 12: Working with Edible Schoolyard NY, Alice Waters' Chez Panisse Foundation and PS216 in Brooklyn, WORKac is designing New York City's first Edible Schoolyard – a back-to-the-earth educational program. The design is a series of interlinked sustainable systems that produce energy and heat, collect rainwater, process compost and sort waste with an off-grid infrastructure.At the heart of the project is the Kitchen Classroom, where up to thirty students can prepare and enjoy meals together. The kitchen's butterfly-shaped roof channels rain water for reclamation. Connected to one side is the Mobile Greenhouse, extending the growing season by covering 1600sf of soil in the colder months and sliding away in the spring, over the Kitchen Classroom. On the other side is the Systems Wall: a series of spaces that include a cistern, space for composting and waste-sorting, solar batteries, dishwashing facilities, a tool shed and a chicken coop. – www.work.ac

FARMING THE SCHOOLYARD

Many schools have large areas of barren, unproductive landscape usually devoted to recreational sports and parking. Some schools have begun the process of greening the school landscape to create more ecologically diverse landscapes, better learning opportunities for children and improved nutrition through organic gardening.

School food gardens can improve children's understanding of natural processes such as plant growth, soil formation and can enhance their understanding of nature. Growing food can also help low-income families with their food bills and ensure children have greater access to healthy, nutritious food that might otherwise not be affordable. The same food can be used to demonstrate healthy food preparation, and this link has been shown to increase the likelihood of children eating the recommended intake of fruit and vegetables. Such food can be used to supplement a school meal or snack program. Also, organic gardening learned at elementary school is a skill that can be valuable throughout adult life. In an age where obesity and inactivity are on the rise, gardening is a healthy outdoor activity that encourages a healthy lifestyle.

FARMING THE BROWNFIELD

Suburbanization and de-industrialization have recently accelerated with world trade agreements, and the shift to global manufacturing has emptied out certain industrial areas in Toronto. The same phenomenon, much more extensive, has been seen in many cities of the USA. The term "brownfields" is used to designate these areas, partly in reference to soil contamination resulting from past industrial practices. The redevelopment potential of brownfields has become evident in recent years, and they are now the targets of attention by the public and private sectors. This has brought a new focus on vacant land in older neighborhoods within the urban core.

Detroit and other shrinking cities have hectares of land covered with derelict houses where the soil is relatively free of the contaminants found in brownfield sites. Detroit was built on high-quality farmland, and now 27 per cent of the land within municipal boundaries is considered vacant. In 2007, the city's community and family gardens yielded 108 tonnes of produce, funnelled to restaurants, food banks and farmers' markets. [3]

Figure 13: The Food Project, a community organization based in Lincoln and Boston, Massachusetts, remediated gardens contaminated with lead. The chosen methods of remediation were composting, phytoremediation and raised beds. Full remediation was done by bringing in enough soil and compost to act as an adequate barrier between the contaminated soil and the garden vegetables. The soil had to be deep enough so that the roots of the vegetables would not reach the contaminated soil. The remediation of two acres of land cost $26,600 US ($42,000 CAD). Setting up this form of remediation required only a few days work. Gardeners were also encouraged to plant mustard plants and sunflowers. These two plants are known to absorb lead and other metals. In addition to compost and phytoremediation, the Food Project also built two raised beds for gardeners. This proved cheaper than buying compost and soil, and allowed gardeners to continue gardening every season.
– www.thefoodproject.org

3 Alter, Llyod. Azure Magazine, 2010

Advances in science are creating new effective strategies for urban environmental clean up within the cities. Such researches include: horticultural phytoremediation of soils at the University of Guelph (using lemon geraniums) and Solar Aquatics, Living Machine, and Living Wall eco-technologies being pursued by Canadian scientists such as John Todd and Wolfgang Amelung. These agricultural, horticultural and composting technologies should be investigated and implemented as part of overall brownfields redevelopment opportunities in the City.

FARMING THE ROOFTOP

Rooftop gardens, or agricultural green roofs, are designed specifically for gardening and food production. They range from simple containers added after a building has been completed, to beds of soil covering almost the entire roof surface installed at the time of construction. There has been a surge in interest in rooftop gardens in recent years that reflect their potential to address some environmental concerns associated with urban buildings.

In higher-density urban areas, the land becomes too expensive to farm. But every building has a roof, and every roof can be designed to feed as well as shelter us. In the past 10 years, many buildings have been designed or retro-fitted with green roofs, with advertised benefits including the reduction of the heat island effect, added bird and insect habitat and improved energy efficiency. But the real rooftop revolution will be the use of green roofs to produce food. [4]

Rooftop gardens have a number of advantages over other food production sites in urban areas. Tenure of land tends to be more secure and the proximity to home and work saves time and effort. Water is often more available for harvesting and irrigation, and crops are generally less prone to theft and vandalism.

Rooftop gardens offer strata residents, and perhaps employees, access to gardening and green space they might otherwise would not be able to enjoy. If designed correctly, rooftop gardens offer a marketing advantage for those developments catering to target age and demographic cohorts that enjoy gardening, or who would be likely to engage in the activity. The ability to "see" outdoor space filled with growing things is important to a quality of life.

Figure 14: On the shoreline of the East River and with a sweeping view of the Manhattan skyline, Eagle Street Rooftop Farm is a 6,000 square foot(557 sq.m) green roof organic vegetable farm located atop a warehouse rooftop in Greenpoint, Brooklyn. Edible roof garden designers Goode Green installed up 90,000 kilograms of compost-rich soil mixed with expanded chale for reduced weight. The roofs soil depth at 18cm can grow shallow-rooted spinach and radishes. Produce from the roof has thus far been sold to local restaurants and to the public through an on-site market – www.rooftopfarms.org

4 Alter, Llyod. Azure Magazine, 2010

Figure 15: Toronto architect Chris Hardwicke's Farm City proposes a dense vertical scheme for cities to feed themselves. Farm City extends the concept to create agricultural areas integrated into new housing towers. By putting housing and farms in the same building, Farm City creates symbiotic relationships between energy, water and waste. Heat generated from the greenhouses is used to heat the housing units. Biomass from the greenhouses is used for energy. Solar energy is generated from the large glazed surface. Grey-water and compost generated from the housing is used in the greenhouses.
– www.completecity.org

FARMING THE Z-AXIS

The vertical farm is an alternative strategy to contemporary farming methods, employed within an urban context, in order to feed an increasing world population on a decreasing amount of arable land. Vertical farms are centres for urban food production, based on a desire to create sustainable cities without relying upon resources beyond their urban footprint.

Dickson Despommier, a professor of environmental health sciences at Columbia University, has become the guru of skyscraper farms, towering spires of glass, greenery and livestock that produce enough food for an entire city. Like a monolithic greenhouse, it relies on hydroponics and grow lights to ensure plentiful production. At skyscraper scale, such elements consume plenty of energy, so the vertical farm also needs to produce its own power. It does so through a methane digester (which operates off the waste generated by plants), as well as other sources appropriate to the location, including geothermal, solar and wind power. Food is continuously grown, year round, within tall structures (around 30-storeys), with a cycling and integration of energy, water, and waste processes to maximize environmental potentials. The "internalized" nature of the food production safegaurds crops against severe weather that contemporary agriculture can suffer from. It also, to some degree, protects foods from communicable disease, with its sterile, controlled environs.

The implementation of vertical farms would localize food sources, reducing the need for imports. As produce would be distributed within a local context, it would also reduce spoilage and support local economies. The farms would provide alternative employment opportunities within the city. As production moves from the country into the city, it would allow for the succession of current agricultural lands into mature ecosystems.

Until recently, urban agriculture was a useful but minor activity in Ontario, carried out mostly for leisure or educational purposes. But interest in local food production has soared to new heights, with thousands of Torontonians wishing to produce some of their own food. It has been recognized that there is enormous potential for urban agriculture in Ontario, including Toronto. Some excellent infrastructure exists that could be better used to support food production, including some of the best soil in Canada. The addition of new infrastructure could further boost urban agriculture in Toronto.

Researchers at York University in Toronto, Ontario Canada completed an analysis of growing spaces available to permit the city to produce 10% of its fresh vegetable requirements from within its own boundary.[5] The study concluded that Toronto required 2,317 hectares of food production area to meet current consumption requirements (based on market purchases). Of this, 1,073 hectares would be available on:

- existing Toronto Census farms and lands currently zoned for food production.

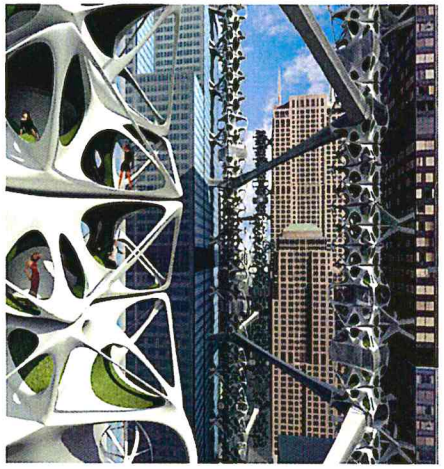


Figure 16: Korean architect Daekwon Park's proposal for the 2008 eVolo competition imagines vertical garden units that can be clipped onto existing skyscrapers. The vertical garden unit is an open structure which provides a habitat for plants, insects, and animals, which also becomes a public park for cities where natural spaces are limited. This unit is combined and multiplied throughout the towers in order to achieve positive effects, such as reducing the urban heat and filter pollutants from the air. – www.evolo.us

- areas zoned for industrial uses.
- about 200 small plots (between 0.5 and 2 hectares) dotted throughout the northern reaches of the city.

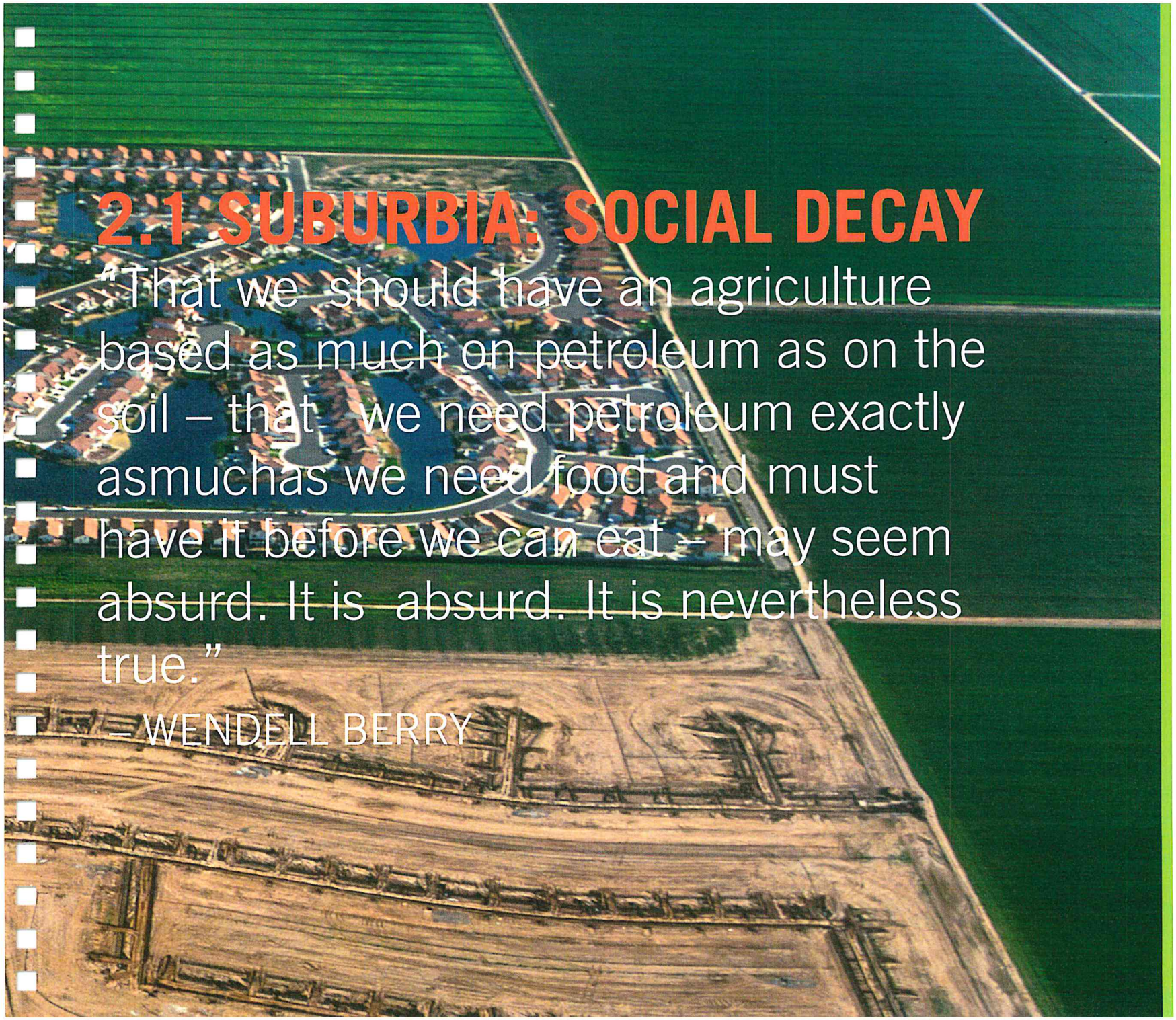
These 1,073 hectares could be supplemented with:

- land within hydro corridors (potentially problematic because of public health concerns about electromagnetic fields, as well high rental costs).
- institutional lands.
- vacant or brownfield sites.
- rooftop production — the maximum rooftop area required would be about 1,243 hectares, approximately 25% of the rooftop area identified as more generally suitable for rooftop greening in the City of Toronto.[6]

Urban farmers and gardeners need long-term and stable access to land to warrant investment in the soil building required for sustainable production. Although many argue that food should be produced primarily in rural and peri-urban areas, it is evident that the failure to control urban and suburban growth in and around large cities, and to protect farmland, makes city growing efforts essential. However, it has to be done in ways that integrate with the urban fabric, complement rural and peri-urban production, and are financially viable for urban growers.

5 MacRae, Rod. et al, 2010
6 Banting, D. et al, 2005

CHAPTER 2.0: THE PROBLEMS

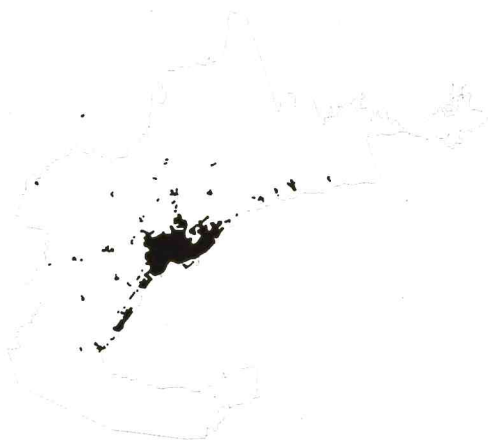


2.1 SUBURBIA: SOCIAL DECAY

"That we should have an agriculture based as much on petroleum as on the soil – that we need petroleum exactly asmuchas we need food and must have it before we can eat – may seem absurd. It is absurd. It is nevertheless true."

– WENDELL BERRY

SOURCE: New Housing Sub-Division and Agricultural Fields, Chandler, Arizona, © 2010 Alex S. MacLean/Landslides



LEFT TO RIGHT:
Figure 17: Sequential Urban Expansion: 1876
Figure 18: Sequential Urban Expansion: 1932
Figure 19: Sequential Urban Expansion: 1967

Source: Ontario Ministry of Public Infrastructure Renewal

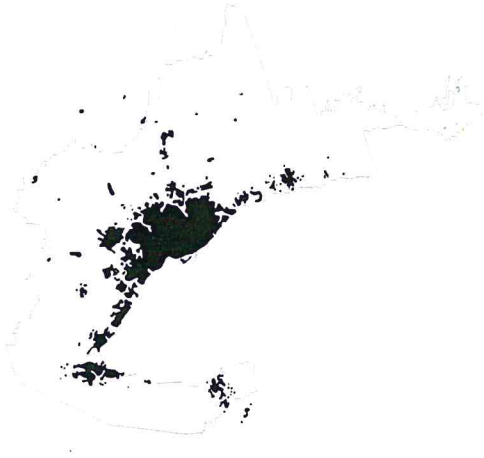
2.1 SUBURBIA: SOCIAL DECAY

Over the past fifty years the North American population has increased steadily.

Due to the phenomenon of the suburban development model, the urban and ecological footprints of our cities have shown unprecedented expansion. Though this model grew out of the socio-economic conditions specific to North America's post-war era[5], it has become the standard model of urban growth, employed widely throughout the developed and developing world. The suburban model can typically be described as low-density, single-detached housing on large-sized lots. The suburban model has come to be considered an "ideal" lifestyle by many, increasing demand for single family homes and perpetuating suburban sprawl.

Richard Ingersoll argues that the suburban model bears a dire social cost.6 He claims that the rapid spatial expansion of cities due to urban sprawl results in the dislocation of social activities and communal associations. Nestled in auto-accessible private housing developments, the suburbanite can effectively sever themselves from any social ties within a community, as no actual community exists in the first place, only a collection of individuals with a shared income bracket.

5 Wilson, Alexander. The Culture of Nature, 1992
6 Ingersoll, Richard. Sprawltown, 2006



LEFT TO RIGHT:
Figure 20: Sequential Urban Expansion: 1992
Figure 21: Sequential Urban Expansion: 2006
Figure 22: Sequential Urban Expansion: 2031

Source: Ontario Ministry of Public Infrastructure Renewal

The modern home is so destructive, I think, because it is a generalization, a product of factory and fashion, an everyplace or a noplace. The modern house is not a response to its place, but rather to the affluence and social status of its owner."[7]

The critic James Howard Kunstler has described suburban living as "cruel mock-ups of an 'ideal' society devoid of economic generative elements, and social wastelands". The suburbs become the new 'ghost-town'.[8] Barren during daylight, sequestered by nightfall, the suburban home evinces a desolate environment breeding angst, alienation, and depression. Drowned in manicured seas of green, the suburbs are tragically doomed to be the areas of first social collapse. Isolated, physically and socially from one another and from the urban context at large, suburbanites eke out an existence shaped by comfort and controlled through consumerism. Slaves to conformity and conventions of half a century ago, the suburbanite exists as an economic anomaly. We are leaving dire choices for our future generations as they are born into a pre-existing economic model, whose survival depends on the exploitation of alienation and conformity.

We live in an environment built upon speed irrelative to our natural ability to absorb information; the speed of the automobile; the speed of population growth; the speed of information flow and the speed of 'the now' mentality our culture is accustomed to. This is apparent in the architecture

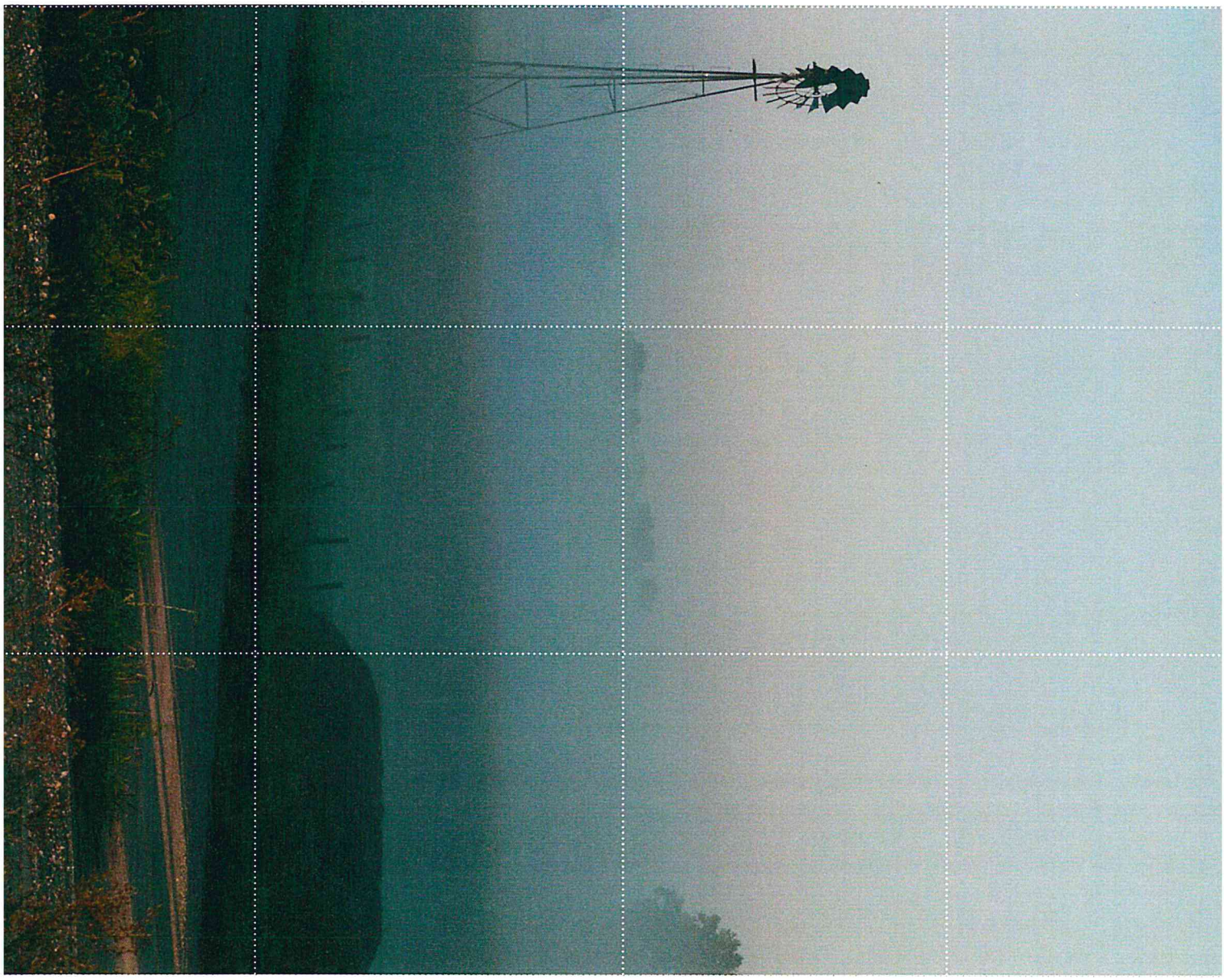
7 Berry, Wendell.
The Unsettling of America (p.52), 1977
8 Kunstler, James Howard.
The Geography of Nowhere, 1993

of our suburban landscape, and freeway developments/office parks, etc. They are destination points connected through speed and commerce, not places of inherent necessity to a community, and therefore they require a minimal standard of design.

> *Mobility is the key to understanding contemporary landscape design, because in the last forty years planners and builders have organized most land development around the automobile. This has had enormous effects on how most of us see the landscape. It has also changed the look and feel of the land itself. The car has encouraged – indeed, insisted on – large-scale development: houses on quarter-acre lots, giant boulevards and expressways that don't welcome bicycles or pedestrians, huge stores or plazas surrounded by massive parking lots.* [9]

As urban sprawl has continued to dominate development in the post-war era, there have been massive implications for rural areas, as they are increasingly thinned of their populace, culture, and lands. Often overlooked is the impact that the loss of prime agricultural land can have on agricultural productivity. The provincial government's position is that Ontario has limited its losses to about 2% of agricultural land per year. However, a 2% loss per annum over 20 years adds up to a 33% total loss.[10]

9 Wilson, Alexander.
The Culture of Nature (p.91), 1992
10 Toronto Food Policy Council (TFPC), 2000



These losses put the onus on contemporary agriculture to provide increasing yields on a decreasing area of arable land. The Greater Toronto Area (GTA) lost 62,000 hectares of farmland within 1976-1996 and two thirds of this loss has taken place in the more urbanized areas of the GTA.[11] At the present pace of development, the loss of 7,500 ha per year[12], the GTA chapter of the Ontario Federation of Agriculture (OFA) believes that we could lose another 85,000 ha of farmlands by 2026. This would mean the GTA would have lost 40% of its agricultural land in a fifty-year period.13 As land that once supported agricultural production is converted to land that only supports consumption, the problem is exacerbated by a further increase of population relying on this severely reduced productive area. Designed only to consume, suburbs wreak havoc as they gobble up our arable lands.

It is estimated that one acre of land is lost to urbanization for every person added to the population.[14] According to leading agronomists, it requires a minimum of 1.2 acres of land to support the annual nutritional requirements of one person.[15] Therefore, if we were to have 36 acres and added 30 people to our population, we would only have enough land capable to feed 5 of them. Considering that Canada's population is currently expanding at a rate of 0.88% per annum[16] (approximately 300,000 people), we would require 360,000 acres to feed them, but we would lose 300,000 acres to urbanization. This is an unbalanced formula for sustainable growth. Currently there are approximately 3.4 acres of arable land (without clear-cutting forest lands), in Canada available to

11 Rural GTA Working Group for the Greater Toronto Co-ordinating Committee, 1999
12 Walton, M. Greater Toronto Area Agricultural Impact Study, GTA Federations of Agriculture, 1999
13 Southworth, N. "Farmers feel under siege as cities close in" Globe & Mail, 1999
14 Statistics Canada. Rural and Small Town Analysis Bulletin, 2005
15 Altieri, Miguel. Agroecology, 1995
16 Statistics Canada
17 Data provided through Statistics Canada. Area of Farmland divided by Canadian Population

every member of our population[17], meaning that we could theoretically feed an additional population three times our current one. However, if we include the rate of arable land lost to urbanization in our equation, we would only be able to support an additional 1.5 times the current population before we run out of arable land. As it has been estimated that our population will double in less than 75 years[18], it can be argued that in approximately one generation we shall barely be able to sustain the food requirements of our own population. We must bear in mind that this only accounts for the people of our own country, not the millions worldwide who require our agricultural exports, nor the enormous amount of feed required to maintain our current livestock populations (who currently consume about 1/3 of the world's grain supply)[19]. How can we truly expect to continue our current development trend and still be able to support global food needs, if we lose the ability to supply our own needs?

We need to re-evaluate and redesign the relationship between land consumption and agricultural productivity if we hope to maintain a sustainable food environment. The next chapter looks at the methodology of our current agricultural system and its viability in terms of environmental sustainability and food security.

18 Statistics Canada
19 FAO Statistics

2.2 AGRICULTURAL DECAY

SOURCE: Airplane crop dusting, Western Arizona,© 2010 Alex S. MacLean/Landslides

2.2 AGRICULTURAL DECAY

Like all businesses, agriculture, is controlled by the mechanisms of supply and demand.

Unlike other commodities however, agriculture is in the advantageous position that its products are a necessity for life. The industrialization of agriculture has allowed for remarkable advancements in crop yield, farm labour practices and food distribution, radically altering agriculture methodologies. We have reaped the benefits of an industrial agricultural system for almost a generation now, all the while becoming more and more reliant upon technology to maintain our food system. Unfortunately, we are entering a period where the industrialization of agriculture is likely to be its downfall. The root of the problem is that our system of production is heavily reliant upon increasing use of fossil-fuels to maintain a decreasing yield. We are artificially supporting a system that is in collapse.

Due to technological advancements that began in the post-war period, the scale of farming has drastically increased. From the introduction of large-scale farm machinery to the development of chemical fertilizers, a new system of agriculture has allowed one farmer to now accomplish what would once have taken ten. This has led to the decline of the family farm, the large-scale exodus from rural areas, and the dominance of single-operator manufactured monocultures.

If you think commercial vegetables are nature's own, you are in for a big surprise. These vegetables are a watery chemical concoction of nitrogen, phosphorous, and potash, with a little help from the seed. And that is just how they taste. And commercial chicken eggs (you can call them eggs if you like) are nothing more than a mixture of synthetic feed, chemicals, and hormones. This is not a product of nature but a man made synthetic in the shape of an egg. The farmer who produces vegetables and eggs of this kind, I call a manufacturer.[1]

From the beginning of the annual growing cycle, the farmer is dependent upon fossil fuel inputs. As the majority of contemporary farms cover huge acreage, machinery is required for a farmer to maintain productivity. These machines, being rather large in scale, require significant amounts of diesel fuel in order to operate.

Beginning in early spring, the field is fertilized in order for the crops to secure the nutrients that they need for growth. These fertilizers have been designed by agribusiness agronomists to ensure a plant

1 Fukuoka, Masanobu. The One-Straw Revolution (p.94), 1978

receives proper nutrients regardless of what type of soil it is planted in. Farmers, who are required to maintain specific yields, typically apply more fertilizer than is required to ensure that their crops will survive. However, any nutrient from the fertilizer that is not utilized by the crop leaches through the soil and can enter water systems. A common occurrence is the leaching of nitrogen from the over-application of synthetic nitrogen fertilizers. This results in the nitrification of water tables, rivers, streams, and lakes, causing significant imbalances in aquatic ecosystems.

The soil is then tilled in preparation for the seeds. Tilling prepares the soil for sowing by turning over weeds, breaking up compacted soil, aerating the earth, and mixing in the previously applied fertilizer. Intensive tilling, which is now conventional practice, can cause significant soil degradation, as it promotes a higher rate of soil loss due to wind and water erosion. Such practices can cause a loss approximately 5-10 tons of topsoil per hectare every year.[2] As only 1 ton of soil per hectare can be created per year using current practices, we are losing our valuable soil resources rapidly.[3] Without a significant layer of topsoil, the only feasible way to grow plants is through artificial inputs.

When the soil has been prepared, the seed is planted. As with all of the previous stages, this is done with the assistance of machinery. As the crop begins to grow, more fertilizer may occasionally be applied, along with other chemical applications in the forms of herbicides and pesticides. The herbicides are designed to remove any weeds that may hinder the growth of the crop. However, as there are many varieties of weeds, the formulas are typically designed to kill any plant other

2 Gleissman, Stephen R. Agroecology, 1998
3 Ibid

than the specific crop itself. Pesticides are employed to protect the crop from insect attack and infestation. Some crops have been genetically engineered to be more receptive to certain pesticides and herbicides. Examples of these are Monsanto's Roundup Ready® seeds, engineered for usage with their agricultural strength Roundup® herbicides.[4] The application of these chemicals not only affects surface plants, but also the millions upon millions of microorganisms that reside in soil.[5] In essence, herbicide and pesticide use sterilizes the soil and removes its natural capability to sustain life, which in turn requires further application of fertilizer. The chemical growth cycle is closed, and the economic security of chemical-dependent agribusiness is assured.

At the final stage of the growing cycle, the crop must be harvested. Again the cycle is maintained, as the large machinery used in harvesting compacts the soil, making tillage a necessity again the next season. Each stage of production on-farm is imbued with fossil fuel inputs. Beyond the production of food itself, are requirements within our globalized food system for the processing, packaging, storage, marketing, and transportation of these agricultural products.

The other resultant of this industrialized agricultural methodology is the support of monoculture cropping systems. Our global food system has increasingly consolidated production into a few commercially viable varieties, rather than the thousands upon thousands of alternative species available worldwide. Consumer demand, market control, trade agreements, and global food conglomerates all contribute to this situation.

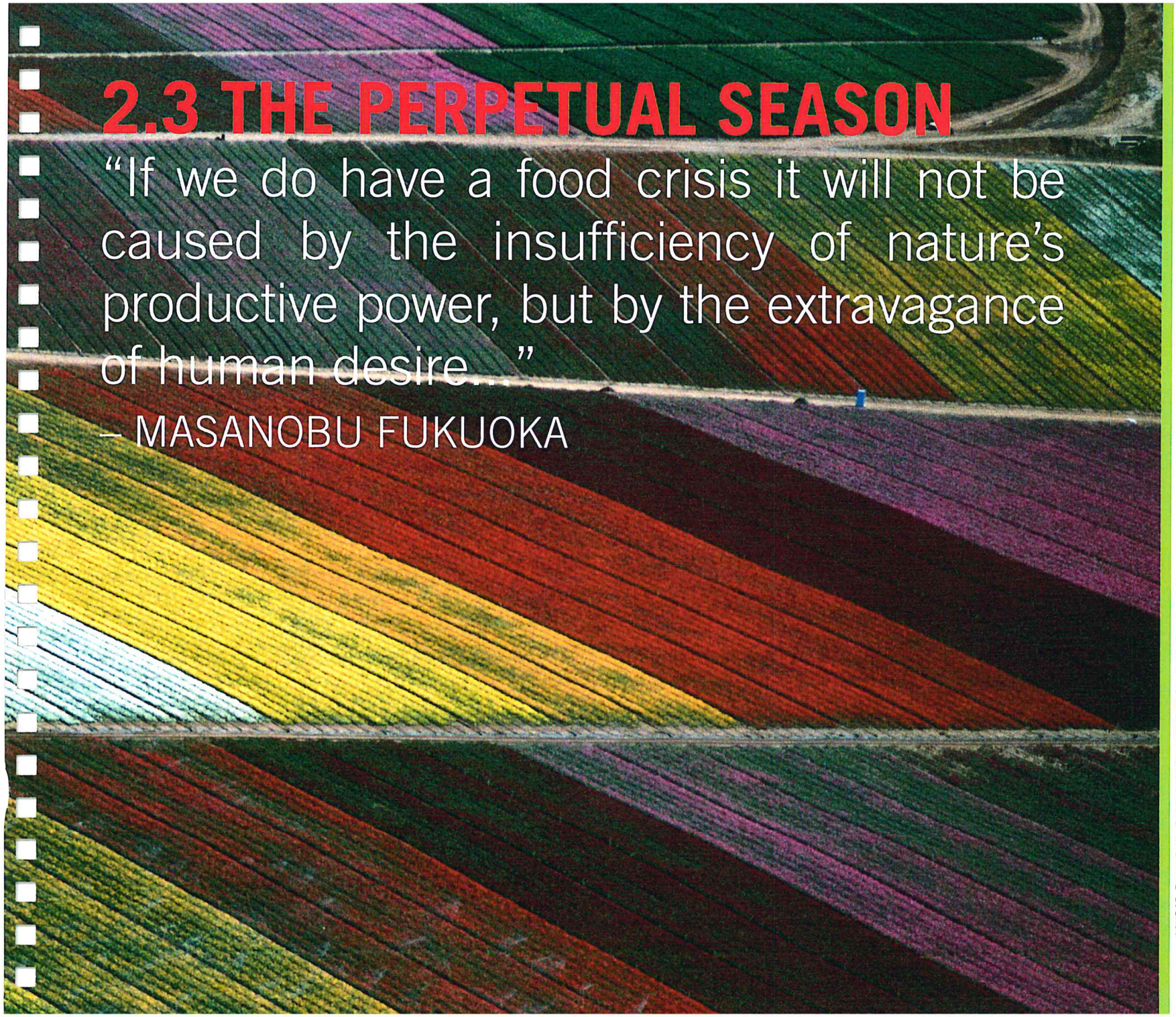
4 www.monsanto.ca
5 Carson, Rachel. Silent Spring, 1962

The appropriate agricultural technology would therefore be diverse; it would aspire to diversity; it would enable the diversification of economies, methods, and species to conform to the diverse kinds of land. It would always use plants and animals together. It would be as attentive to decay as to growth, to maintenance as to production. It would return all wastes to the soil, control erosion, and conserve water. To enable care and devotion and to safeguard the local communities and cultures of agriculture, it would use the land in small holdings. It would aspire to make each farm so far as possible the source of its own operating energy, by the use of human energy, work animals, methane, wind or water or solar power. The mechanical aspect of the technology would serve to harness or enhance the energy available on the farm. It would not be permitted to replace such energies with imported fuels, replace people, or to replace or reduce human skills.[6]

It is not only within the methodologies of agriculture that diversity is threatened. The survival of agricultures is threatened as well. Within ecosystems biodiversity helps ensure the health of natural systems. The same can be said of agro-ecosystems. The more diverse and 'natural' they are the more successful they are in preventing widespread disease and disaster. As we lose valuable native species to the monocultures of corporate agriculture, biodiversity suffers, crop health deteriorates, and the system becomes reliant once again upon external factors for survival.

Our agricultural methodologies fall prey to commercial interests of narrowed focus, rather than to the diverse interests of the people. It is this narrowing of focus that keeps industrial agriculture as the model for all agricultural production, a system that profits the few, while laying waste to local lands, destroying local economies, and deteriorating rural cultures. We have enjoyed an era of cheap food reliant upon cheap non-renewable energy. Our exploitative methodology of production has degraded nature's inherent ability to provide. We have, through external forces, subsidization and vested interests, been able to artificially support a food system that even now cannot provide stable yields. How can we place our reliance, let alone our faith, in a system that innately contains its own seed of collapse? It is time to evaluate our ideals of seasonal production, and our relationship to our food. One such relationship is the developed desire and need for imported food and food products.

6 Berry, Wendell. The Unsettling of America (p.89-90), 1977



2.3 THE PERPETUAL SEASON

"If we do have a food crisis it will not be caused by the insufficiency of nature's productive power, but by the extravagance of human desire..."

– MASANOBU FUKUOKA

SOURCE: Flower Fields, Carlsbad, California, © 2010 Alex S. MacLean/Landslides

2.3 THE PERPETUAL SEASON

We are no longer tied to our land for our food sustenance.

In Canada, the food that makes up an average meal may travel about 1,500 km[1] from field to table. Our society has become accustomed to the easy gratification of its gastronomic desires. Developments in agricultural technologies, distribution methods, and globalized trade systems have created the notion of a perpetual growing season. This notion has instilled the desire for food products unavailable locally, removing considerations of place in regards to food security and availability. As we have developed reliance upon the perpetual season, a homogenized food machine has been created, undermining local agricultures, economies, and food cultures.

The primary force driving the idea of a perpetual season is the growth in global trade of food and food products. Through the importation of items which are 'out-of-season' in our home zones, we have developed a dependency on a massive global food network. This network makes it necessary for produce to be shipped cheaply[2] from countries with continual or different growing seasons to other parts of the world. Even when local produce is available, imported items still have a high profile in local food stores due to the economics of the food distribution system.

1 Pfeiffer, Dale Allen. Eating Fossil Fuels, 2006
2 Due to the current era of cheap fossil energy

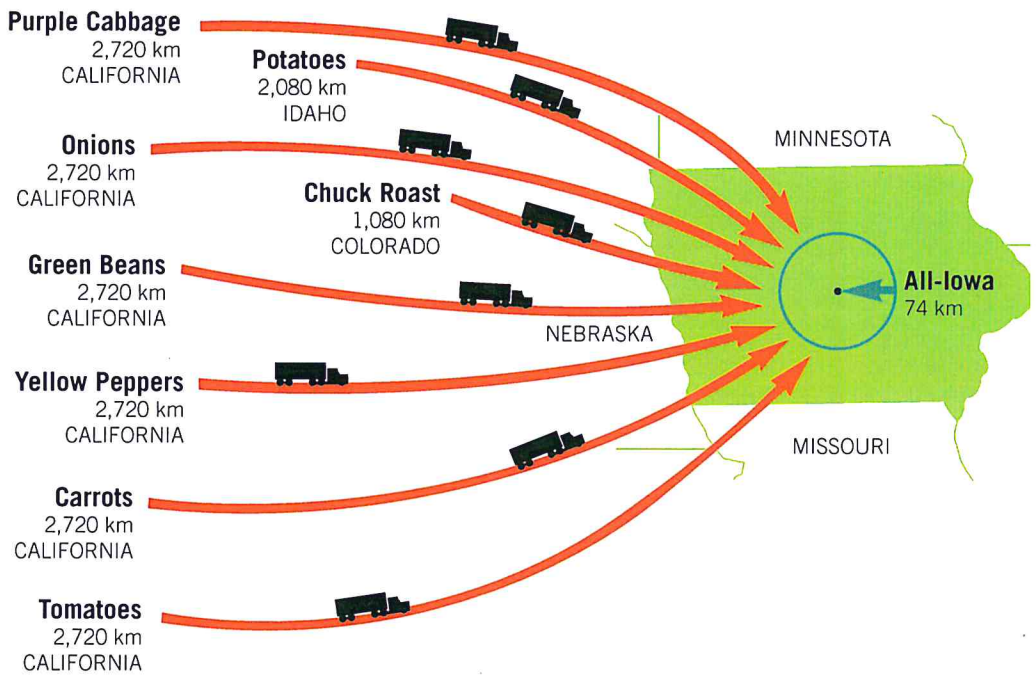


Figure 23:
Local Versus Imported Ingredients - Iowa
Source: Halweil, Brian - Eat Here (p.30)

Traditional diets, formerly dictated by local availability of foods, have been abandoned as food is now imported from a world away. And dietary habits are also heavily influenced and even created by the whims of food scientists. A person in Toronto can savour the flavours of the Orient one day, the robust fares of Northern Europe the next and feast on Middle Eastern delicacies on another, each meal garnished with slices of a "fresh" tomato or orange in the dead of winter.

> *The industrialization of agriculture – which included the development of supermarkets – also led to the homogenization of the seasons as summer produce (or some semblance of it) began to appear in winter as well.* [3]

The variety and scarcity of foods related to growing seasons no longer apply. Continual availability has not only created a market where dependency on foreign items becomes the norm, even during seasons of local production, but it has changed the native diet of a region. Local cuisine is rapidly diminishing and in some locales has vanished completely. This is not to imply that a certain amount of imported food is not necessary or beneficial to cultures with short growing seasons, rather the issue lies in an increasing dependence on imported items that could be supplied from much closer to home. This import dependency supports the dominance of industrialized agriculture.

3 Wilson, Alexander. The Culture of Nature (p.32), 1992

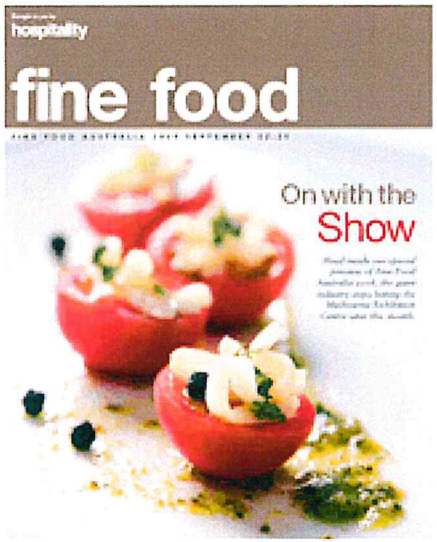


Figure 24: Fine Food Australia 2008, Hospitality Magazine

The consumers' willingness to pay high prices for food produced out of season has also contributed to the increased use of artificial growing methods and chemicals. [4]

The notion that a product that looks good must be good for us has been ingrained into our social consciousness by the media of food. This in turn makes the process that creates these products a secondary and inconsequential issue for most consumers. Consumers expect perfect-looking food. Their desire and demand for "image" food products supports the growth of industrial chemical agriculture.

The consumer demands large, shiny, unblemished produce of a regular shape. To satisfy these desires, agricultural chemicals which were not used five or six years ago have come rapidly into use. [5]

By developing a desire for mass homogeneity of food products, agribusiness shapes the market and is able to dictate a particular agricultural methodology. Control has been removed from the producer and placed in the hands of global corporations. This removes the producer from the context of his locality. Food is produced for profits, not for people.

4 Fukuoka, Masanobu. The One-Straw Revolution (p.85), 1978
5 Ibid

There has been a change in the way we view our food. This change has involves the idea that our food is a mere commodity, something meant only for consumption. We are not the growers, owners or stewards of the foods we eat. Through an increasingly modified and homogenized diet, produced by the industrial food system and maintained irresistible consumer convenience, a valuable aspect of our cultures is eroding.

> *The last important change wrought by the Western diet is not, strictly speaking, ecological. But the industrialization of our food that we call the Western diet is systematically destroying traditional food cultures. Before the modern food era – and before nutritionism – people relied for guidance about what to eat on their national or regional cultures. We think of culture as a set of beliefs and practices to help mediate our relationship to other people, but of course culture has also played a critical role in helping mediate people's relationship to nature. Eating is a big part of that relationship, cultures have had a great deal to say about what and how and why and when and how much we should eat.* [6]

As Jules Pretty (Professor of Environment and Society at the University of Essex) argues, not only are we affected by the food systems we support, but the land is as well:

6 Pollan, Micheal. New York Times (Excerpt from Unhappy Meals)

We are also shaped by our systems of food production, as they, in turn, shape nature, and rely upon its resources for success. We are affected by what we know about these systems – whether we approve or disapprove, whether the food system is local or distant. We are, of course, fundamentally shaped by the food itself. Without food, we are clearly nothing. It is not a lifestyle add-on or a fashion statement. The choices we make about food affect both us, intrinsically, and nature, extrinsically. We make one set of choices, and we end up with a diet-related disease and a damaged environment. We make another set, and we eat healthily, and sustain nature through sustainable systems of food production. In truth, it is not such a simple dichotomy as this. But once we accept the idea of the fundamental nature of this connection, then we start to see options for personal, collective and global recovery.

The connection is philosophical, spiritual and physical. We are buying a system of production when we purchase food. In effect, we eat the view and consume the landscape. Clearly, the more we consume of one thing, the more likely it is to be produced. But if the system of production has negative side effects, and cares not about the resources upon which it relies, then we have taken a path leading, ultimately, to disaster. On the other hand, if our choices mean more food comes from systems of agricultural production that increase the stock of nature, that improve the environment while at the same time producing the food, then this is a different path – a path towards sustainability. We must now shape this new path. We will, by walking it, also change ourselves. We will adapt and evolve, and new connections will be established. [7]

7 Pretty, Jules. Agri-Culture (p.11), 2002

As our physical, psychological, and spiritual connections to our food system become further removed from their original source, food becomes a commodity rather than an essential element within cultures. The cultural shift in our notions of food has changed what was once a social concern to what is now merely a concern of commodity production. A consumptive mentality further weakens the connection we have with the production of our food, and the enjoyment that can be derived from producing it. *"If we make the growing of food a drudgery, which is what "agribusiness" does make of it, then we also make a drudgery of eating and living."* [8]

Food is something we have in our genes to care about, and we have been severed from that caring for too long. If we could once again regard the act of growing food as a sacred, biological act that connects us to all living creatures, perhaps we would clamour for a system of farming that builds communities, maintains balanced pest populations, keeps soil out of rivers, and doesn't traffic in chemicals that are alien to our tissues. [9]

8 Berry, Wendell. The Unsettling of America (p.138), 1977
9 Benyus, Jane. Biomimicry (p.57), 1998

To sustain urban and rural cultures and populations, we need to make a new shift in our concepts and considerations about food and food production. It's time to address the vast distances food travels to satisfy our desires, with an emphasis on local food production all year-round wherever possible.

Within the GTA, arable land and space can be reclaimed and combined with year-round production methods to counteract the majority of Toronto's imported agricultural produce. Overall, in order to shift to a secure and sustainable food supply, we need to reassess our overly consumptive pattern of land development, and change our contemporary "seasonal" agricultural production methods. There is a looming food crisis; a crisis currently begun in developing nations; a crisis resulting from our food-as-commodity culture shift, our adherence to industrial agriculture practices, and our unseasonable desires for exotic and perfect foods.

2.4 THE FIELDS OF WRATH

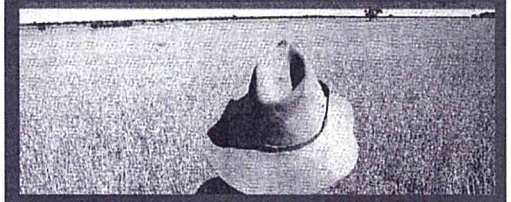
"...and in the eyes of the hungry there is a growing wrath. In the souls of the people the grapes of wrath are filling and growing heavy, growing heavy for the vintage."

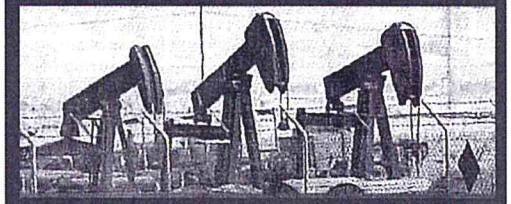
– THE GRAPES OF WRATH

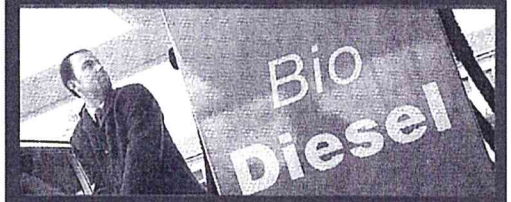
SOURCE: Two fields once contained within stone walls; one of them has now been reclaimed by the forest, North Admas, Massachusetts,© 2010 Alex S. MacLean/Landslides

Prices are rising ...

A combination of high oil and fuel prices, rising demand for food, the use of farmland and crops for biofuels, bad weather and speculation on futures markets have pushed up food prices.

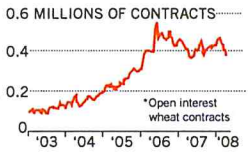






CAUSES

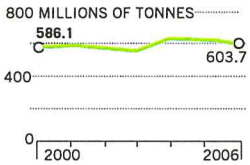
WHEAT INVESTMENT*



HOT MONEY

Global investment funds saw the potential for profits in comoodities outstripping the potential of the stock market, and started diving into oil in 2002, followed by metals and then grains. This move was fuelled by falling interest rates- which make fixed-income investments less attractive - and a weak dollar, which tends to drive up the price of dollar-denominated commodities such as grains. Speculative investment in these markets has pushed prices of corn, soybeans, wheat and rice to new highs.

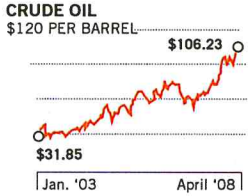
WHEAT PRODUCTION



HIGH AND DRY

Unfavourable weather, particularly in Australia, a major wheat exporter, has wreaked havoc on crops. Governments and private grain dealers used to hold large inventories in case a bad harvest created a sudden shortage. But over the years, these inventories have dwindled on the belief that counries suffering crop failures could import the food they needed. That left the world food balance vulnerable to a crisis affecting many countries at once.

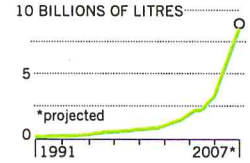
CRUDE OIL



CRUDE AWAKENING

With oil now above $100 a barrel, energy prices have become a major factor driving up agricultural costs. A lot of fuel goes into producing fertilizer, running tractors and, not least, transporting farm products to consumers. Oil prices are being driven higher in part by the growth in major, emerging economies, including China and India. Directly and indirectly, these rising economic powers are competing with other countries forscarce resources, including oil and farmland, driving up prices for raw materials.

BIOFUEL PRODUCTION

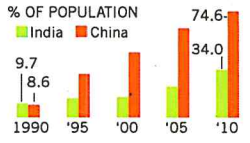


BLAME BIOFUELS

Spurred by fears over global warming and the drive for energy independence, countries have moved aggressively to promote the production of ethanol made from corn. That means more land is being used to grow biofuel feedstock, and used less to grow food. The United States is using subsidies to realize a mandate to produce 34 billion litres of ethanol, made from corn, ths year and 38 billion litres in 2009.

◀ **Ethanol represents 90% of biofuel production**

GROWTH OF MIDDLE CLASS



RISING MIDDLE CLASS

A growing number of people in emerging economies now find themselves wealthy enough to start eating a more varied diet. Not only are consumers in places such as India and China eating more meals, their diets have changed with an increasing demand for meat. Arable land diverted to producing feed for animals reduces land available to grow crops for humans. Producing a kilo of meat takes many times the number of acres required to produce a kilo of rice.

Figure 25:
PRICES ARE RISING CHART,
The Globe and Mail 04/12/2008

2.4 THE FIELDS OF WRATH

In any static complex system, the more stages there are, the greater the opportunity for failure.

It's a frightening fact that failure could, and does occur within our food system. Failure can mean widespread disease, famine and death. The massive scale of the system, which is global in nature makes it easy to see that a failure in one part of the world can and will affect the rest. We have many expectations of our food. We expect that it will not harm us. We expect it will be available and varied. And we expect it will be affordable so we can maintain our lifestyle. All these expectations are threatened by the unwieldy scale of our existing food systems. There is an ever-expanding health risk associated with food production and distribution. Shortages of staple foods have been noted worldwide. The price of food relies upon so many factors beyond our control, such as inclement weather, plant diseases, insect infestations, or speculation on futures markets. As our food system has grown increasingly larger – so too has its potential instability.

With the current scale of our food networks, tracking the source of potential or occurring threats is a monumental endeavour. Too many cooks in the kitchen—a recipe for disaster.

In a highly centralized and industrialized food-supply system there can be no small disaster. Whether it be a production "error" or a corn blight, the disaster is not foreseen until it exists; it is not recognized until it is widespread. By contrast, a highly diversified, small-farm agriculture combined with local marketing is literally crisscrossed with margins, and these margins work both to allow and encourage care and to contain damage.[7]

If we look at recent health crises linked to food, we note that many are linked to the sheer scale of the system. Factory farming contributes to the rapid spread and development of animal borne-disease.[8] Even organics, a popular totem of health, can become harmful when a stage in the system fails.[9] In this case, the failure was reportedly linked to improper storage. Our continuing solution to these threats has been to further uphold the industrial system of food production, applying patchwork scientific methods and remedies to secure food safety. Animal health within close-quartered environments is maintained by injecting livestock with antibiotics, and hormones.[10] Harmful bacteria, such as E coli, that can be introduced through processing, packaging, and storage procedures, is guarded against by irradiation of meat[11] (in the United States) and recently leaf vegetables.[12] Chemical preservatives are added to processed foods to prolong their shelf-life.[13] Recently it was discovered that a chemical commonly used in food packaging, contributes directly

7 Berry, Wendell. The Unsettling of America (p.223), 1977
8 CBC. Passionate Eye "*Frankensteer*" (06/04/2007)
9 "*Organic Food Goes Global but at what Cost?*" - The Globe and Mail (05/05/2008)
10 Pollan, Michael. An Omnivore's Dilemma, 2006
11 The Fatal Harvest Reader
12 "*Irradiation is the most effective way to kill bacteria lurking in salad greens*" - The Globe and Mail (04/15/2008)
13 The Fatal Harvest Readerr

to cancer.[14] Vegetables are artificially ripened with ethylene gas so they appear fresh upon purchase, after being picked prematurely and transported long distances. All these measures are taken to ensure that our food supply is safe from harmful elements, attractive to consumers, and reduced to formulaic methodologies. However, we do not know what long-term health effects these processes may cause.

As we strive to feed a growing world population – we wage a constant war against nature to provide increased yields to satisfy world demand. The Green Revolution of Agriculture promised to be a boon to agricultural productivity and to free the world from hunger. Its industrialized approach to agriculture provided huge yields and massive surplus during initial development. As years wore on however, production levels peaked and in some instances began to decline.[15] Although industrialization of food production has managed to keep pace with the world population, it has turned out to be a major obstacle in satisfying local demands in developing nations.

> *The Green Revolution of the 1960s "converted" whole nations from a relatively healthful, native-derived crop diet to one of foreign-bred wheat, rice, corn, oats, and so on. Everywhere, farmers have abandoned local plants that were hardy, disease resistant, and well-suited to their climate, and are instead growing plants imported from other regions, plants dependent on chemical and petroleum companies for their yields.*[16]

14 "*Bisphenol A can alter genes, study finds*" – The Globe and Mail (04/18/2008)
15 Pfeiffer, Dale Allen. Eating Fossil Fuels, 2006
16 Benyus, Jane – Biomimicry (p.160), 1998

With new technologies and methodologies introduced to agricultural production in developing nations, there was a shift from the growth of staple crops to feed a local populace, to the production of cash or seasonal crops to fill foreign demands. At the same time, developed nations dumped surplus staple foods into foreign markets destroying the market viability of local crops.[17] In the past, countries would hold this surplus in reserve for the possibility of years when there would be a poor harvest.[18] With the development of world demand and trade, these surpluses are now sent across the globe to flood foreign markets. Farmers are denied the opportunity to feed themselves or gain economic benefits from local markets.[19] This creates a dependency on foreign items, even during seasons of viable local production, and it changes the native diet of a region.

Global warming has been blamed for the increase in frequency and devastation of natural disasters we have seen in the past few years. Prolonged drought has led to the devastating yields of Australia's wheat crops.[20] The UN has predicted that a few degrees increase in temperature will have a devastating effect on food production in many parts of the world. Countries whose capacity for food production is already unstable could lose their already limited capability of growing their own food, relying further upon imports. These disasters wreak havoc on staple food supplies which, already stressed, are in increasing demand as world population continues to grow.

17 Lappé, Frances Moore. Hope's Edge, 2002
18 *"How the CUpboards went Bare"* - The Globe and Mail (04/12/2008)
19 Lappé, Frances Moore. Hope's Edge, 2002
20 Australia is the 3rd largest exporter of wheat behind the United States and Canada

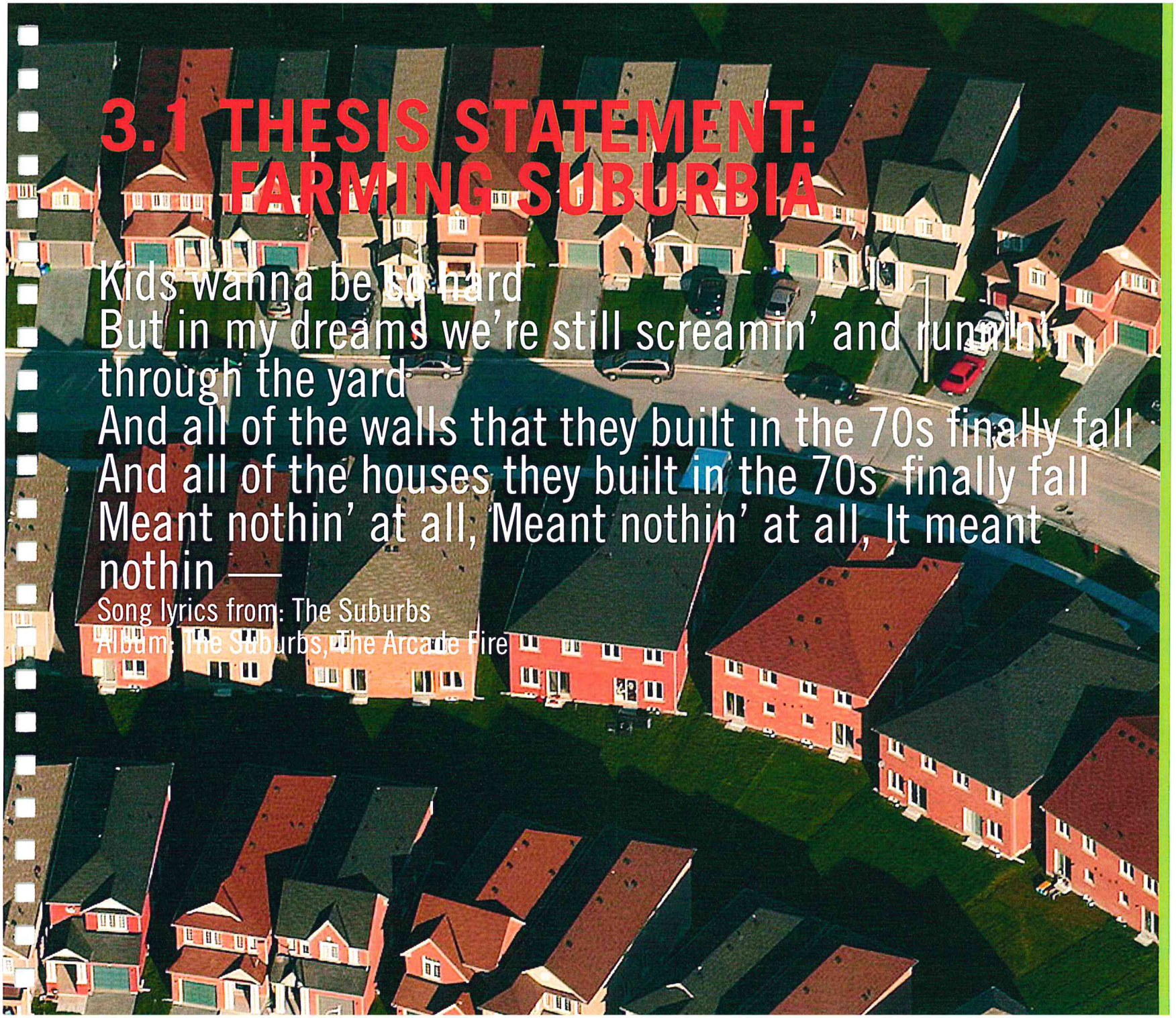
Our growing hunger for energy is another cause for concern regarding world food shortages. There are now huge markets for grain-based biofuels as countries attempt to lower their carbon footprint by regulating the use of 'renewable' fuels. However, studies indicate that the production of biofuels, particularly ethanol, results in a net energy loss.[21] Essentially it requires more energy to produce the fuel than is actually derived from it. Farmers, aware of market demands and trends, race to convert fields of food to fields of "fuel" to reap increased short term profits.

Increasing food prices are also partly the result an emerging desire for a Western diet in developing countries. A diet that is founded on wheat and heavy in meat protein. This far-from-healthy diet is intensive to produce and diverts food staples from people to animals. In Canada, previously known as the world's bread basket, we are currently importing five times as much grain as we did ten years ago, while exporting ¼ less.[22] As we produce more grain than we consume, this change can only be accounted for through the doubling of national meat production within the same time frame. However, as we are only consuming 25% percent more meat than we did before,[23] so the change is primarily for the export market. We can confidently assume that the demand is coming from the emerging middle class in developing countries such as China and India, who with newly acquired wealth, and huge populations, are spending more of their newfound income upon food.

21 Pimentel, David. Food, Energy, and Society, 1980
22 Statistics Canada. Agricultural Imports/Exports, 2006
23 Statistics Canada. Food Statistics, 2006

CHAPTER 3.0: GRAFTING

3.1 THESIS STATEMENT: FARMING SUBURBIA



Kids wanna be so hard
But in my dreams we're still screamin' and runnin' through the yard
And all of the walls that they built in the 70s finally fall
And all of the houses they built in the 70s finally fall
Meant nothin' at all, Meant nothin' at all, It meant nothin —

Song lyrics from: The Suburbs
Album: The Suburbs, The Arcade Fire

Photo by IDuke, November 2005. Source: IDuke (English Wikipedia) [CC-BY-SA-2.5], via Wikimedia Commons

3.1 THESIS STATEMENT: FARMING SUBURBIA

Suburban sprawl continues to consume the rural landscape, pushing it further away from the cities we live in. This auto-dependant, low-density, nowhere-ville pattern of development has effectively severed suburbanites from any neighbourhood social activities and communal associations. A similar rift has distanced us from the food we prepare and eat. The dualism that separates city and country in our culture runs counter to the idea that food can be grown or produced where it is consumed.

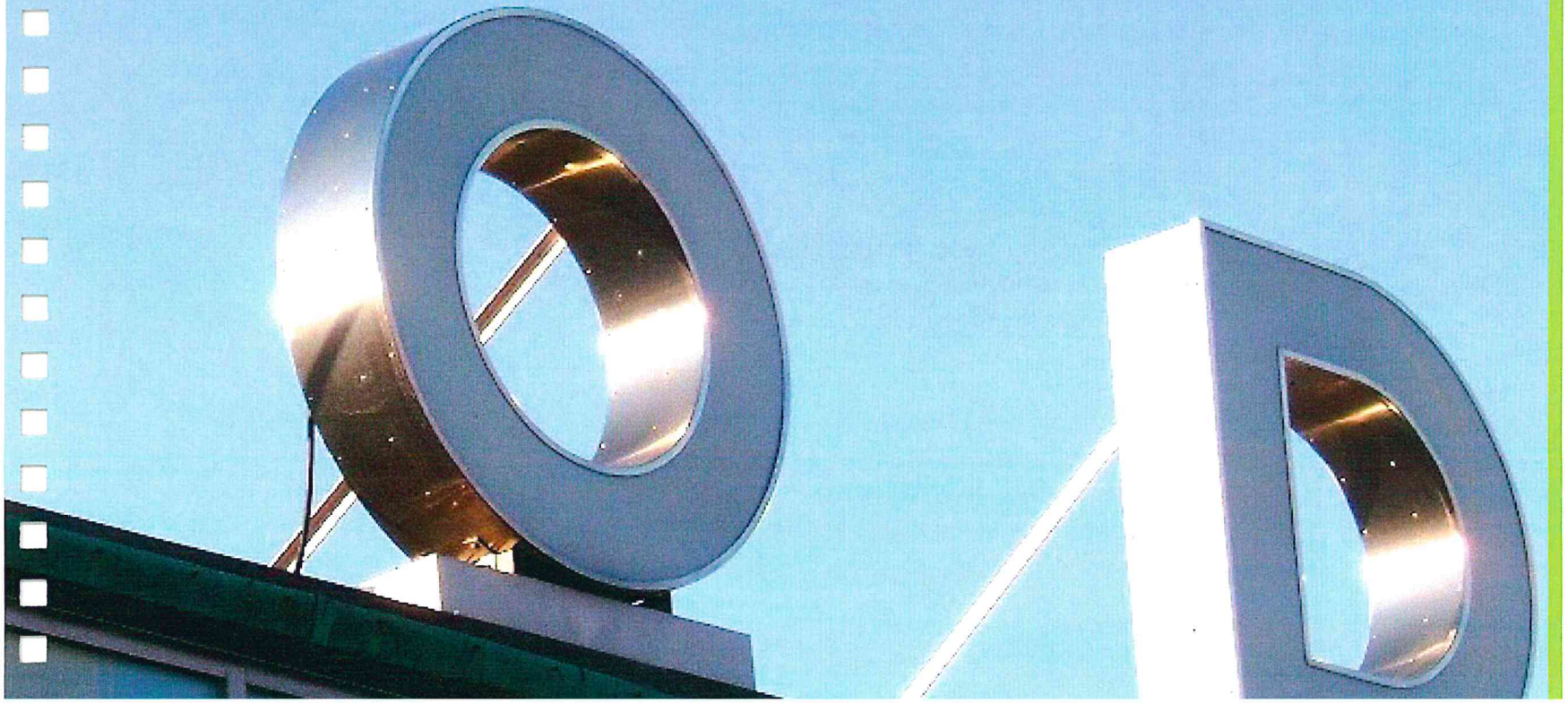
Farming Suburbia proposes an alternative to the urbanization model of the suburbs, a transformation of spaces to (re)connect people to food production and enhance social cohesion. Suburban, less-than-urban, low-density areas would continue to exist with my proposal. However, I propose to alter the existing low-density patterns of development by integrating food production into existing spaces closer to places of consumption, like a graft or insertion with the overall goal of (re)establishing the healthy, enjoyable relationship between people and the products of their land. Food produced closer to home is intended as a supplement to our current food production system, while questioning its wisdom and providing alternatives. The insertion of local food production can be the fuel to ignite a greater sense of community. Food can be the great (re)connector.

Figure 26:
Grafting sequence.

3.2 MECHANISMS: CASE STUDIES

"... architects and designers should pay attention to the city's multiple functions as a dining room, market and farm."

— KAREN FRANCK, FOOD AND THE CITY



3.2 MECHANISMS: CASE STUDIES

The landscapes that produce our food are invisible in the supermarket.

We cannot see the cornfield in the cereal aisle or the vegetable rows in the produce aisle, nor can we see the means by which the raw materials are processed, milled, roasted, cleaned, packaged and transported. So we may wonder, staring down the aisles of a supermarket, where it all comes from and how it all gets here.

The short answer is: it comes from a very large farm, very far away. In 2007, the average farm in the United States was 449 acres and the average item of food traveled 3000 kilometers from source to table. Annually, seventeen percent of the national energy used it expended in the agricultural sector; one-fifth of that amount is used in growing and harvesting, the rest in transportation, packaging, storage.

In the Greater Toronto Area (GTA) between 50-60 percent of all produce consumed is imported, mostly from Florida, California, and Mexico and it is estimated that the food system accounts for 25 percent of the Toronto ecological footprint. The industrial food system spends considerable time and money moving food around. The separation between city and country in our culture is contrary to the idea that food should be produced where it is consumed. We envision a pure countryside as the

appropriate location for growing food and cannot imagine farms in metropolitan centers of culture, commerce, and consumption. Should cheap supplies of fuel fail us, both growers and consumers would be put in a vulnerable situation by this system. If sustainability is a measure of the balance of a system's inputs and outputs, we are creating a wildly unsustainable situation. Michael Pollan – suggests that 56 calories of fuel is currently used to transport every one calorie of food coast to coast!

The design professions have not focused on access to food, as much as they have on clean air or water, as central issues of sustainable design. This is a result, in part, of faith in an invisible system that does not appear broken. Also, farms are generally perceived as harmless and they do not seem to require regulation in the way a refinery might. This passive approach has led to the wholesale conversion of agricultural lands into suburbia in many metropolitan areas and growing distance between the sites of food production and its consumption. Recognizing that food is as important to daily life as air and water, and that the system that supplies it is far from healthy, how can the design professions take a more active role in shaping the sphere in which farming occurs?

The following precedents are ways designers can help create and preserve farmland in urbanized areas. Suggesting that food be produced where it is consumed, in urban centres and suburbs, seems somehow romantic, perhaps foolish, and even utopian. While we may never be able to produce all the food we need in our own backyard, there is potential for insertions, acts of radical

agriculture, or cooperative partnerships to supplement the industrial system while questioning its wisdom. Evidence that the public supports this approach exists in the fully-subscribed community supported agriculture (CSA) programs across the country, in the growing number of farmer's markets, and in the renewed popularity of victory gardens in residential yards. These movements indicate the public will to transform the way we eat.

Several major obstacles exist when it comes to locating farms in urbanized areas: high real estate values make it unrealistic for farmers to buy or rent land at market prices; there is limited availability of adequate parcels of land, as a working farm will require at least one acre; perceived nuisances of farm operations may create resistance from neighbours; and zoning by-laws restrict agricultural uses in urbanized areas.

Mechanisms for countering these obstacles include: conservation easements, right-to-farm agreements, and lease agreements with multiple private owners. Another strategy, examined closer here, is to foster partnerships between landholders and farmers, creating hybrid agricultural landscapes. There are precedents for cooperative ventures of farms inserted in housing and parks, bordering playgrounds and wetlands, producing food for their immediate communities. Successful examples include: a CSA in Portland, Oregon that operates from two locations --- 16 acres on City-managed open lands and 12 acres in a public park; and a four-acre farm on city park lands in San Francisco, California that sells at the local farmer's market.

In the cooperative venture model, the landholders may be private developers, not-for-profit organizations, or land trusts. Or they may be public entities, such as cities, counties, or utility companies. The farmers may be employees of the land manager, tenants, part of a collective lease, or lessors of several small parcels in an urban area. As a result of these partnerships, the agricultural operations act as part of hybrid productive landscapes, in conjunction with other landscape programs, such as public parks, planned housing communities, city-owned open space and university or museum campuses.

The projects examined here are working farms, small businesses with a goal of production and profit, rather than demonstration or educational projects. They are small in size, anywhere from seven to fifty acres. Markets for their produce include CSAs, farmer's markets, restaurants and produce brokers. Typically, as part of the partnerships, farmers are provided with basic infrastructure, including irrigation and fencing. Often a business plan has been prepared by the farmers to achieve financial self-sufficiency. In some cases, farmers are provided with start-up capital. Permits and variances are acquired for agricultural use by the landowner or manager. Following are brief case studies of three successful partnerships, each representing a different configuration of the owner-manager-farmer relationship.

SANDHILL ORGANICS

Sandhill Organics is a 16-acre farm located in the planned subdivision of Prairie Crossing, about an hour's drive from Chicago. Prairie Crossing is a conservation community of 400 homes, set in restored native grassland. The farm was conceived as part of the master plan for the community, and a sales fee from the new homes funded the farm's infrastructure. The current farmer has a long-term lease for the land with the developer. Established in 2004, Sandhill Organics sells at farmer's markets and runs a 280-member CSA (community-supported agriculture). One-fifth of the CSA members live in the surrounding development, and more residents shop at the on-site farmer's market. The farm has three year-round employees and at the height of the season employs ten people.

An important part of the success of this project is that the farmer owns the business. Long-term management of an agricultural operation by a committee of non-farmers, such as the homeowners association, can result in poor business decisions. Initially, in this case study, a farmer was employed by the developer, but arbitrary rules made it difficult for the business to succeed. Leasing to an experience farmer allowed the business to be run as needed more successfully.

Careful boundary design also contributes to the success of the overall landscape. Topography and plant material are employed to separate homes from the farm. The adjacent homes get views to distant fields and a walking trail that connects the development offers closer views of the farm. The farm is near retail, schools, and neighbours and is within an hour drive of customers in the city. Yet the farm is rural enough to benefit from fuel and fertilizer deliveries from the agricultural co-op.

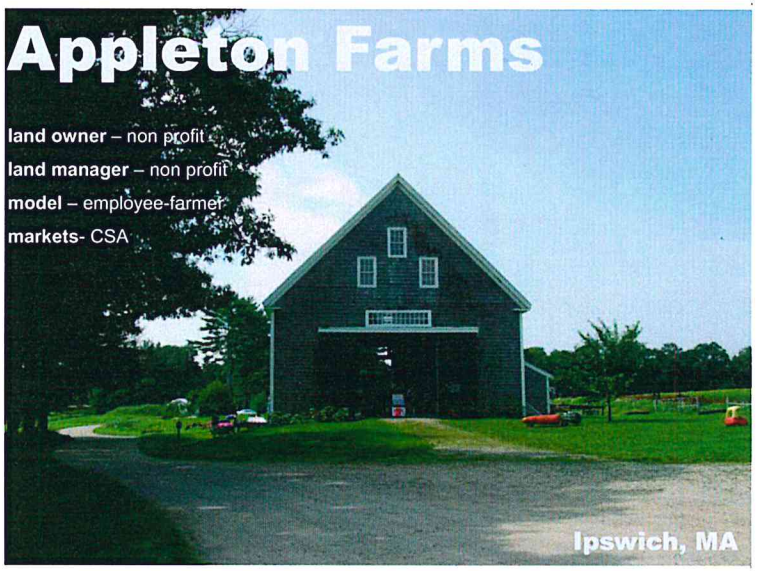
APPLETON FARMS CSA

Appleton Farms CSA is located on 25 acres in a public park an hour east of Boston, Massachusetts. The Trustees for Reservations (TFR), a land trust, manages the park, which is approximately 700 acres and features walking trails, horseback riding and bird watching. Prior to being deeded to TFR, the land was an active dairy farm with operations dating to 1638. Given the history of the land, TFR was committed to keeping active agricultural on the property, along with recreation and conservation programs.

This is an example of the employee model in which TFR employs the farmers and provides start-up capital with a business plan. Established in 2002, Appleton Farms took four years to become financially self-sufficient. It is now fully subscribed – growing produce for 530 families in the area – and operating from its revenues.

Given the rural setting, TFR understood that not competing with the neighbouring farmers was crucial to the success of the project. Research indicated that no organic CSA was operating in the area, and this directed the choice of farm type. This strategy has proven successful, as there have been no complaints over privatized enterprise on public lands. The unique quality of public interaction is also a strength of this project. Rather than receiving produce deliveries, subscribers

come to the farm to pick up their share. This strategy can be implemented in urban or suburban farms to create strong links between each of the consumers and the agricultural landscape through direct experience.



SUNOL AG PARK

Based on the business park model, where separate entities rent parcels of a larger development, Sunol Ag Park hosts six (6) farmers on 18 acres. Developed by SAGE, a local not-for-profit, the park is located on a public utility easement, about an hour east of San Francisco. SAGE holds a longterm lease with the utility company and provides ongoing management of the Ag Park. Sunol Ag Park is also a recreational park with access to a small architectural icon at one end and a bike trail around the perimeter of the farm.

The tenants include a co-operative of immigrant farmers, a CSA for low-income subscribers and a specialty tomato farm. Each farmer leases an area from two to seven acres separated from each other by rows of sunflowers. The infrastructure involves irrigation, deer fencing and a small office, all developed by SAGE prior to leasing to the farmer's markets for the produce grown in the Ag Park. Clients include farmer's markets, restaurants, produce brokers and CSA shares. The farmers pay rent and water costs to SAGE.

Identifying underutilized open land in metropolitan areas for conversion to farming is an important strategy for increasing access to land. Utility easements are a good prospect, given the stable nature of the land ownership and allowed uses. This type of project requires the presence of a third party, such as a not-for-profit, to handle the permitting, negotiations and management of the tenants and to act as the developer.

In this case, parcelization of the larger acreage increased the number of sites available to farmers, which is of particular benefit in urban and suburban areas. Experienced farmers tend to own land in more rural areas, while farmers interested in city and suburban sites tend to be less experienced. With a greater number of smaller parcels available, the farmers can begin with a small operation,

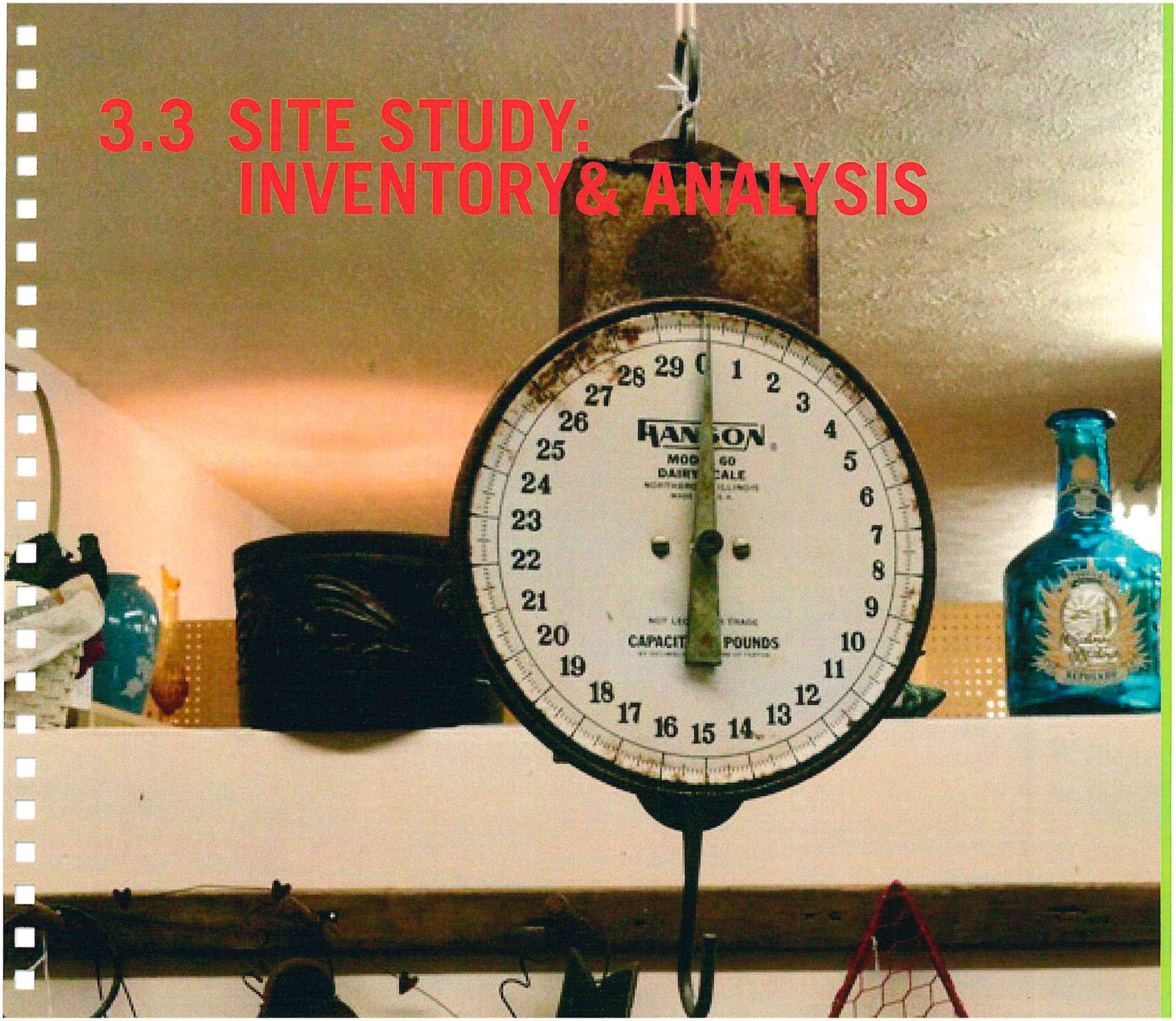
requiring less start-up investment and expertise. As they become more experienced at growing and marketing, they can expand their business, perhaps eventually finding a full-scale farm off-site. Working under this model also means that farmers can share equipment and avoid the burden of purchasing expensive items of their own.

CASE STUDIES: CONCLUSION

These agricultural landscapes are important insertions in the urban and suburban context at many levels. They are part of a process by which land can be used for agricultural operations near the source of consumption. Thus, these landscapes enhance the food security system of a community. By placing farms on land accessible to the public, either physically or visually, they provide an important spiritual and cultural link between consumers and the food they eat. They bring consumers closer to the processes by which their food is produced. Finally, by reducing the distance between consumers and producers, these landscapes contribute to a more environmentally sustainable food system.

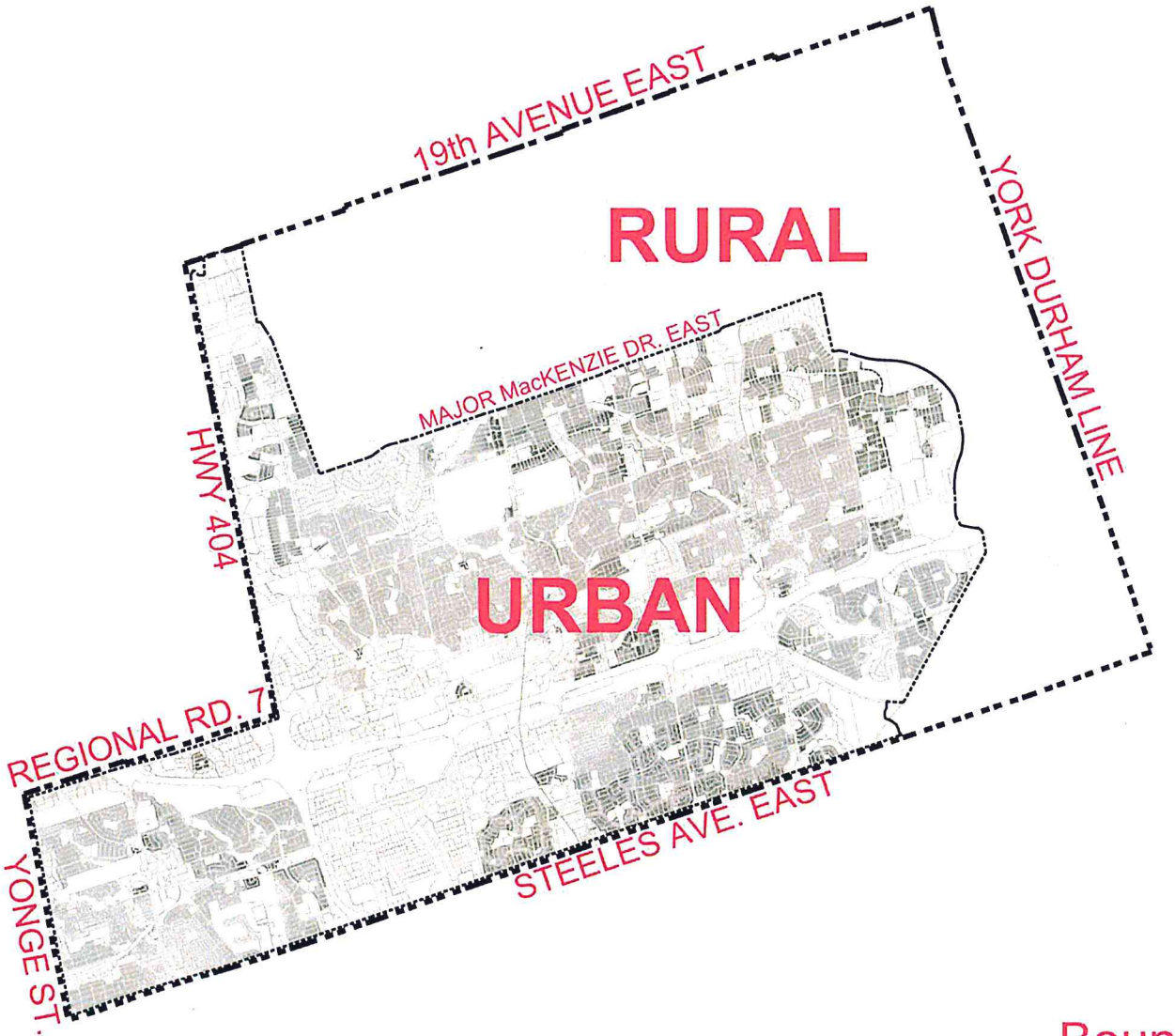
The farms examined here represent one segment of the very wide field of agricultural experiments - small farms practicing outside the norm of "very big" and "very far away". This is a form of agriculture that is not behind the scenes but is very much part of the visible community. They serve as examples of the ways landscape architects and urban planners can create and preserve farmland in urban areas.

3.3 SITE STUDY: INVENTORY & ANALYSIS

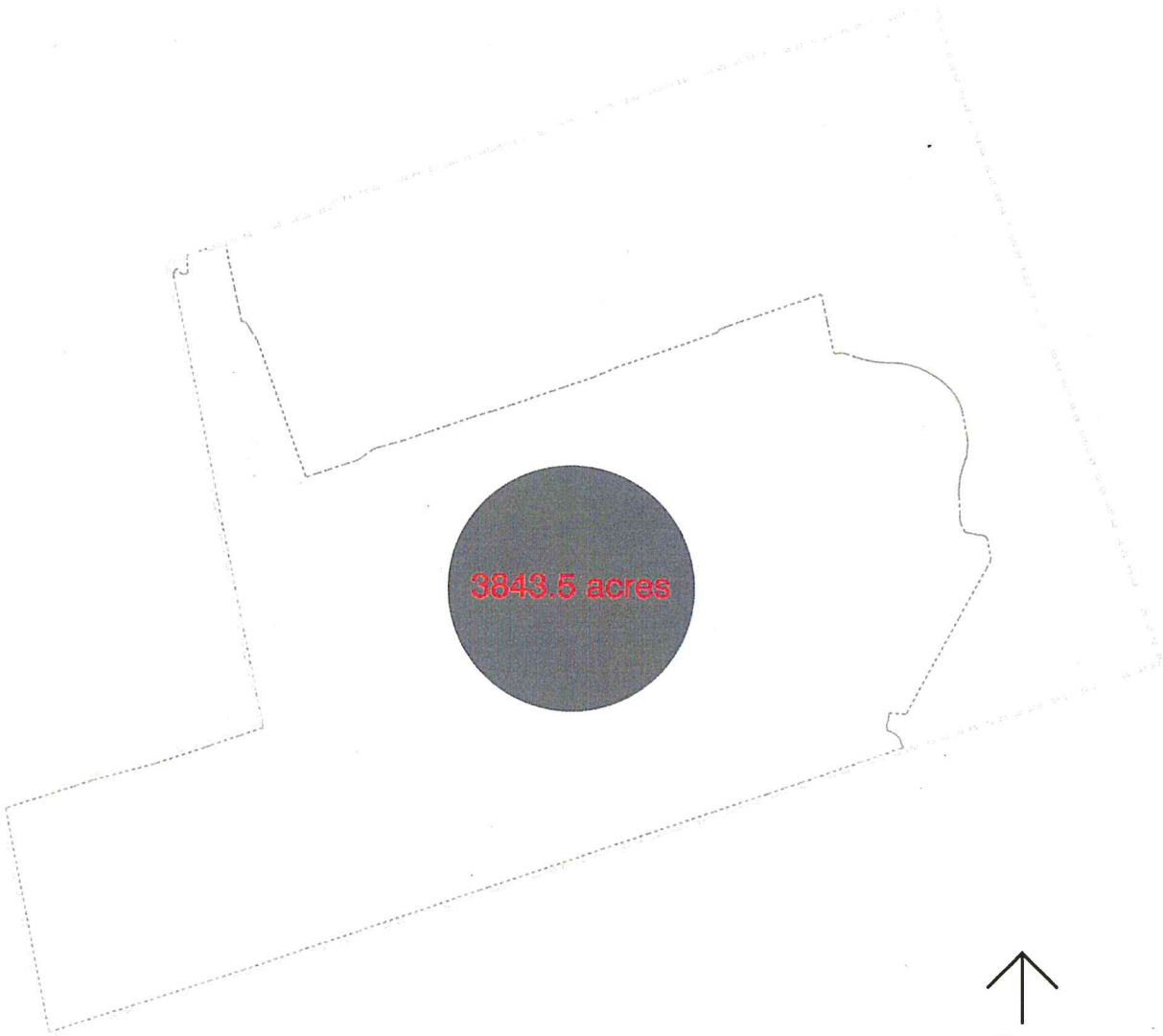


3.3 STUDY SITE: INVENTORY

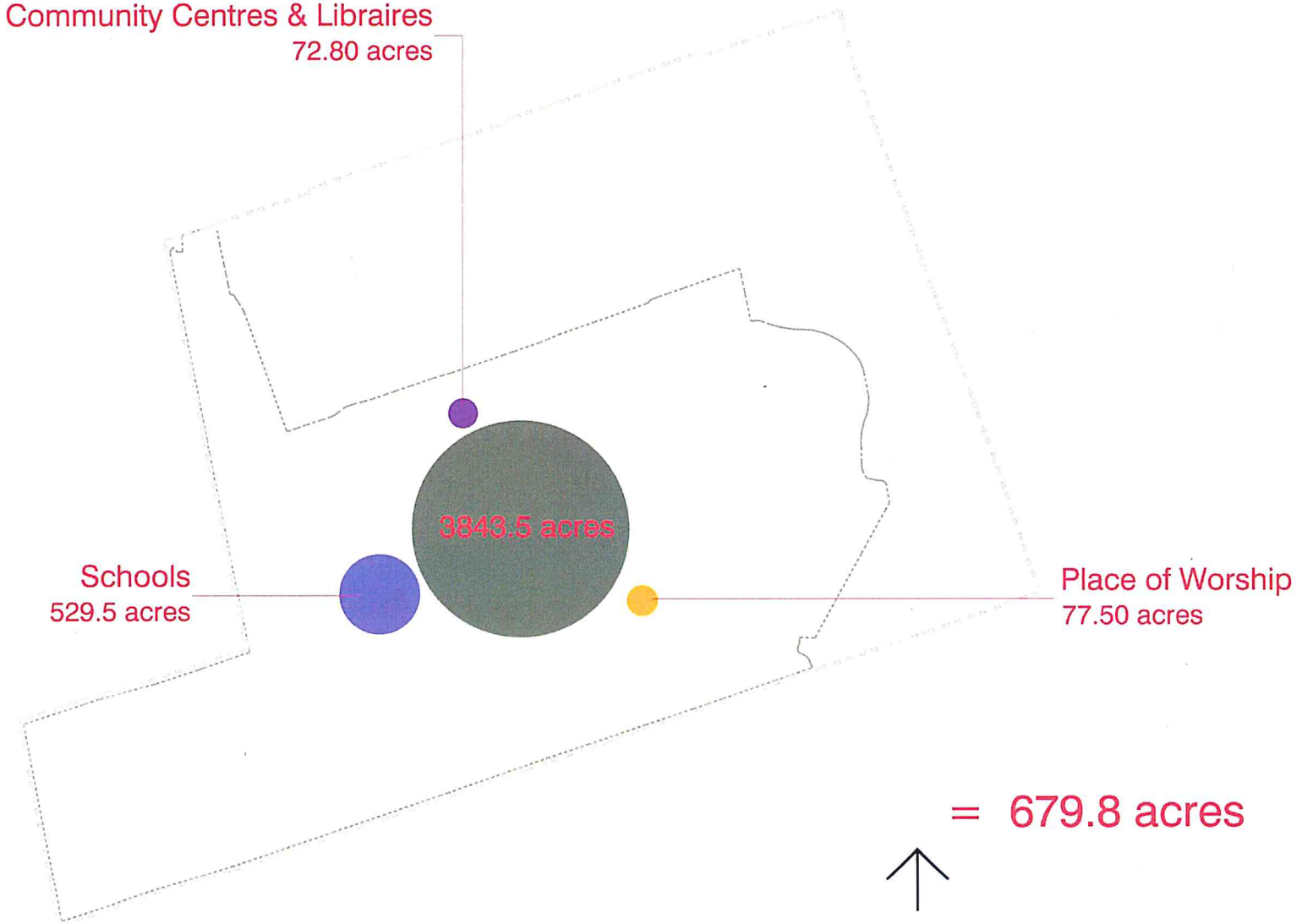
The first step to organizing a suburb based on the idea of a local food system is to develop an available land inventory of the municipality. The following information has been extracted from The City of Markham Data (based on 2011 Census data and Auto CAD format information). All areas notes are estimates and provided for public parks, community centres, libraries, schools and places of worship within Markham, ON.



Boundaries
Markham, Ontario, 2011

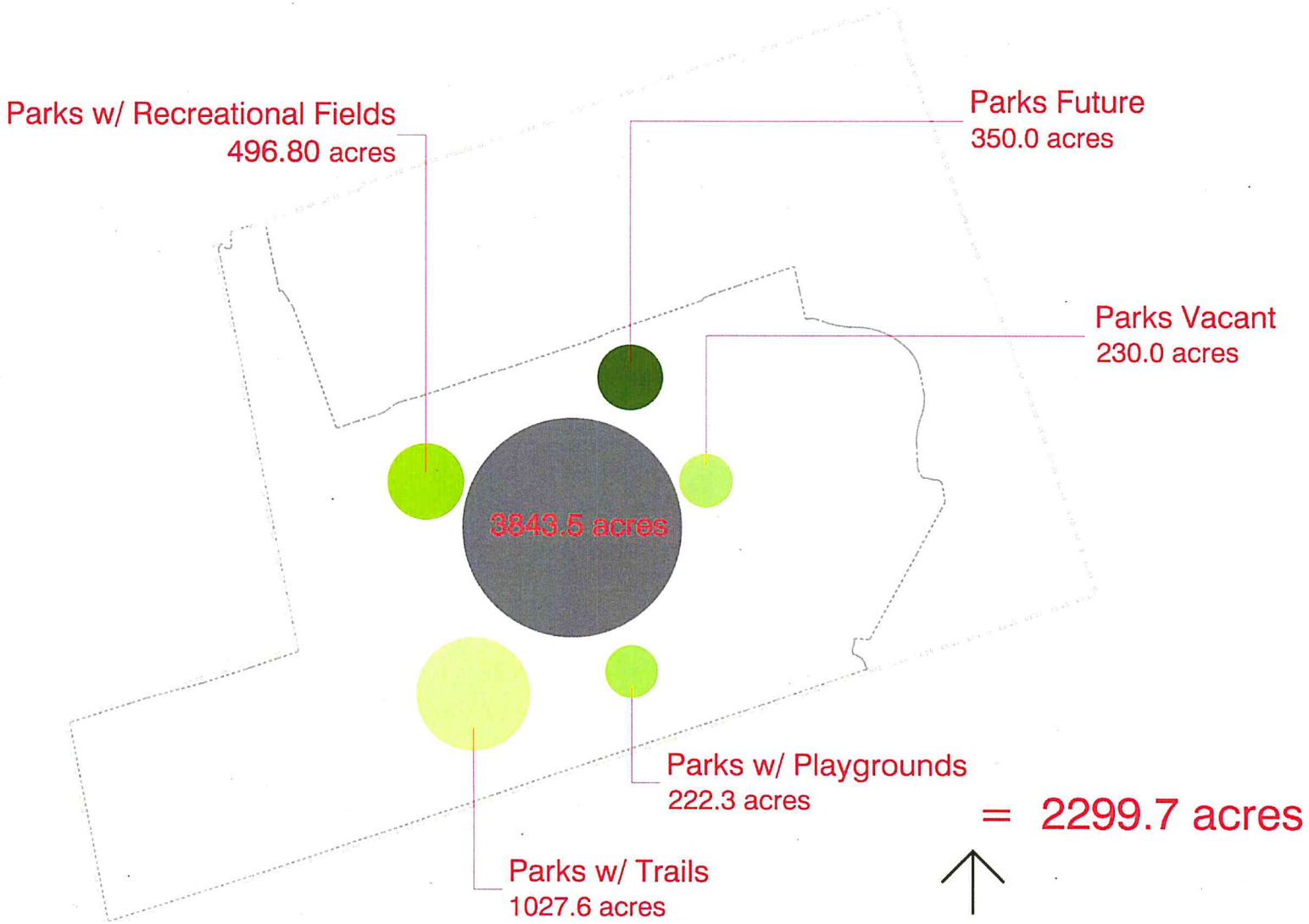


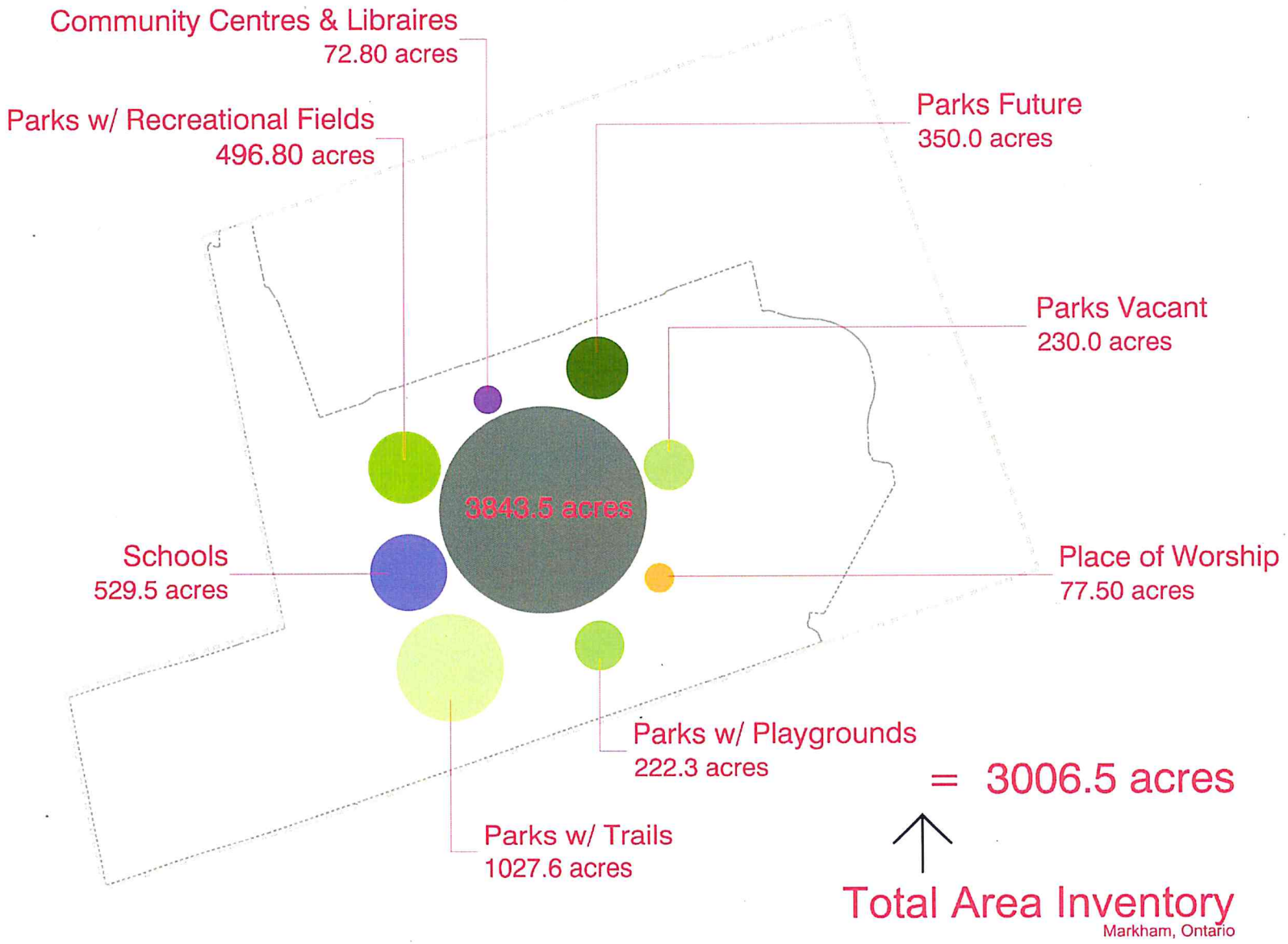
Building Footprint
Markham, Ontario

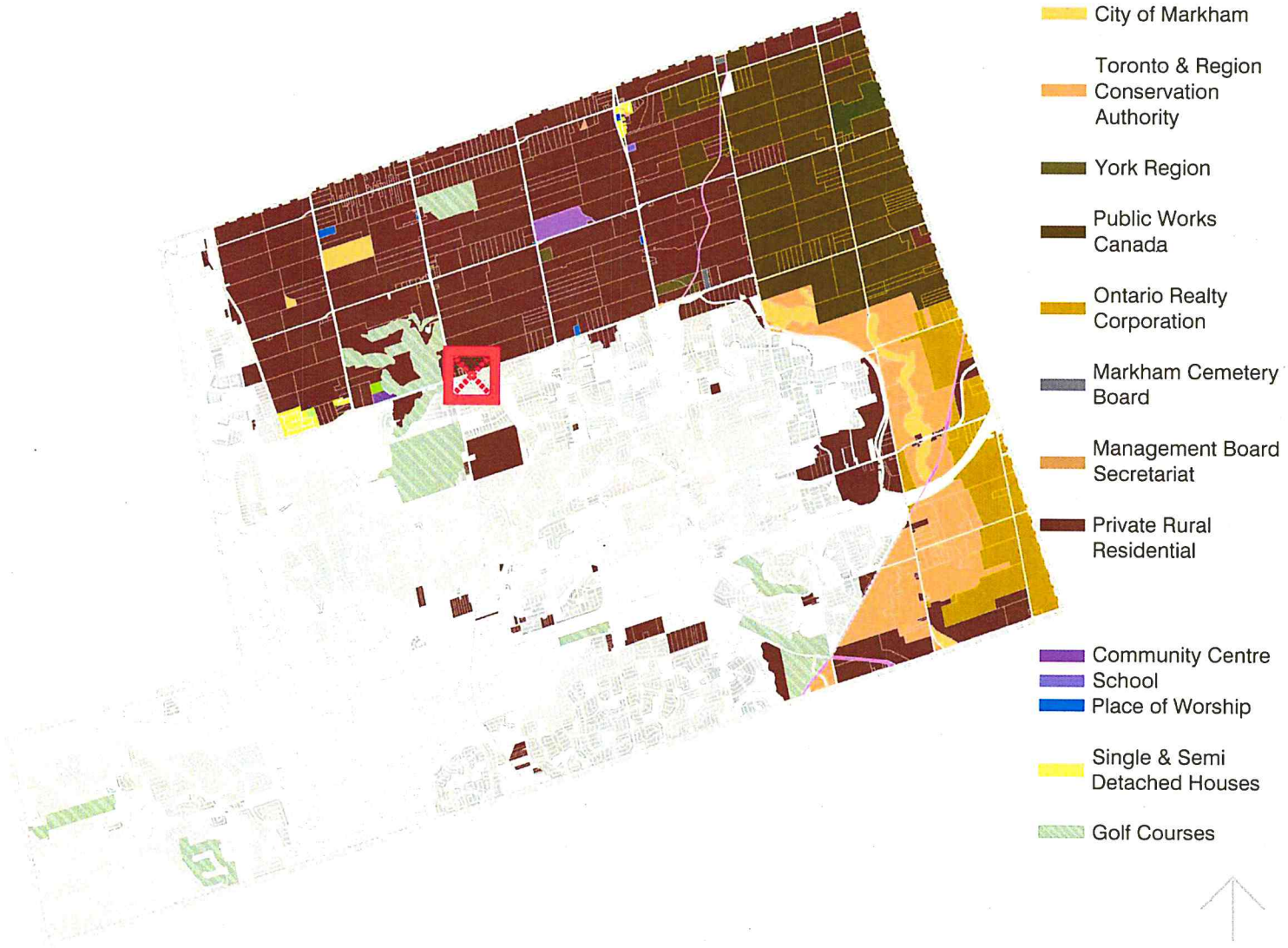


= 679.8 acres

Community Area Inventory
Markham, Ontario


Parks w/ Recreational Fields
496.80 acres
Parks Future
350.0 acres
Parks Vacant
230.0 acres
3843.5 acres
Parks w/ Playgrounds
222.3 acres
Parks w/ Trails
1027.6 acres
= 2299.7 acres
Parks Area Inventory
Markham, Ontario


Community Centres & Libraires
72.80 acres
Parks w/ Recreational Fields
496.80 acres
Parks Future
350.0 acres
Parks Vacant
230.0 acres
3843.5 acres
Schools
529.5 acres
Place of Worship
77.50 acres
Parks w/ Playgrounds
222.3 acres
Parks w/ Trails
1027.6 acres
= 3006.5 acres
Total Area Inventory
Markham, Ontario



Agricultural Zones and Rural Lands

Markham, Ontario, 2011

GOAL: find opportunities for urban connections to farming places

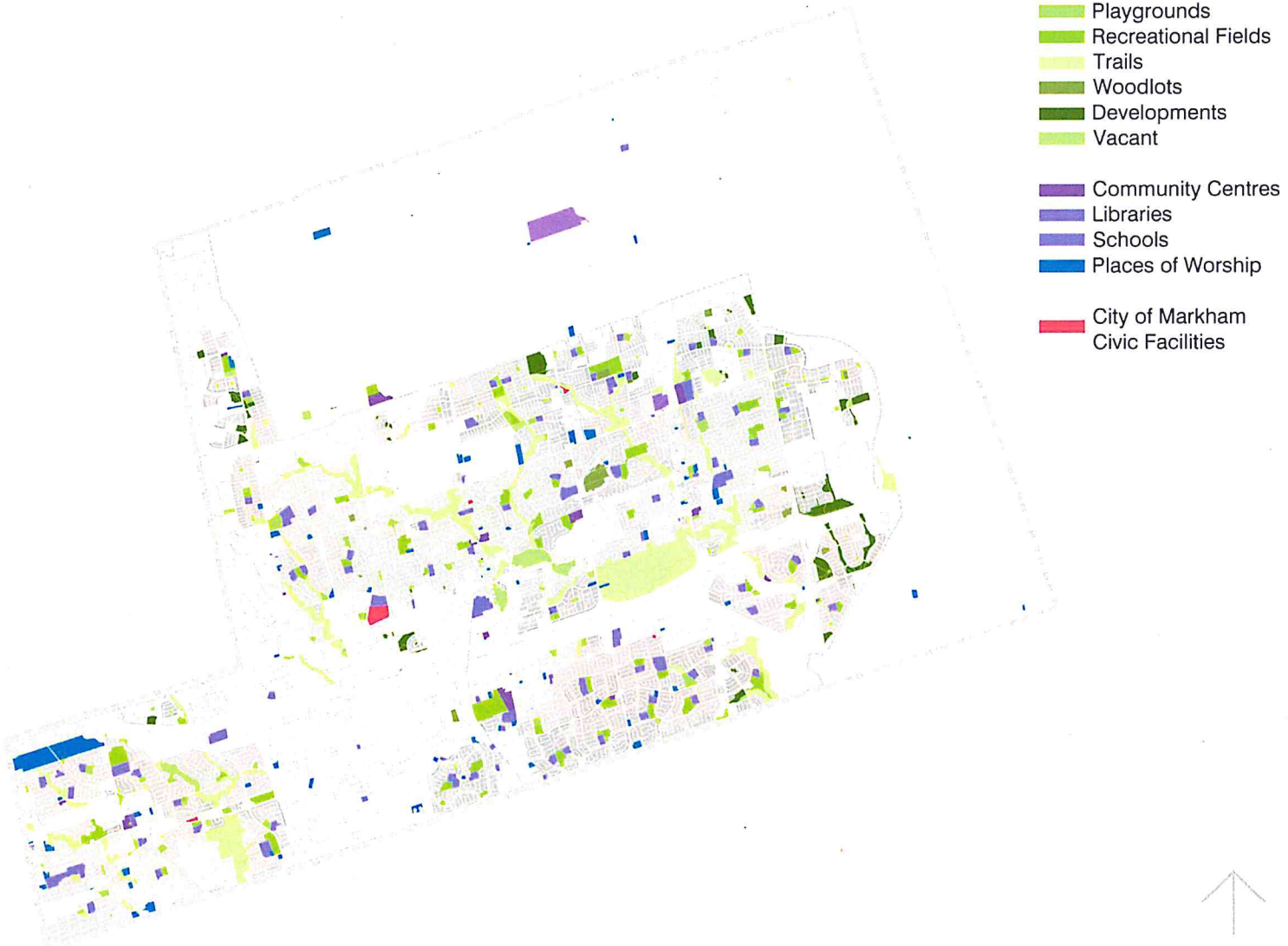
Markham, Ontario, 2011

STUDY SITE: ANALYSIS

The GOOD, the BAD and the UGLY

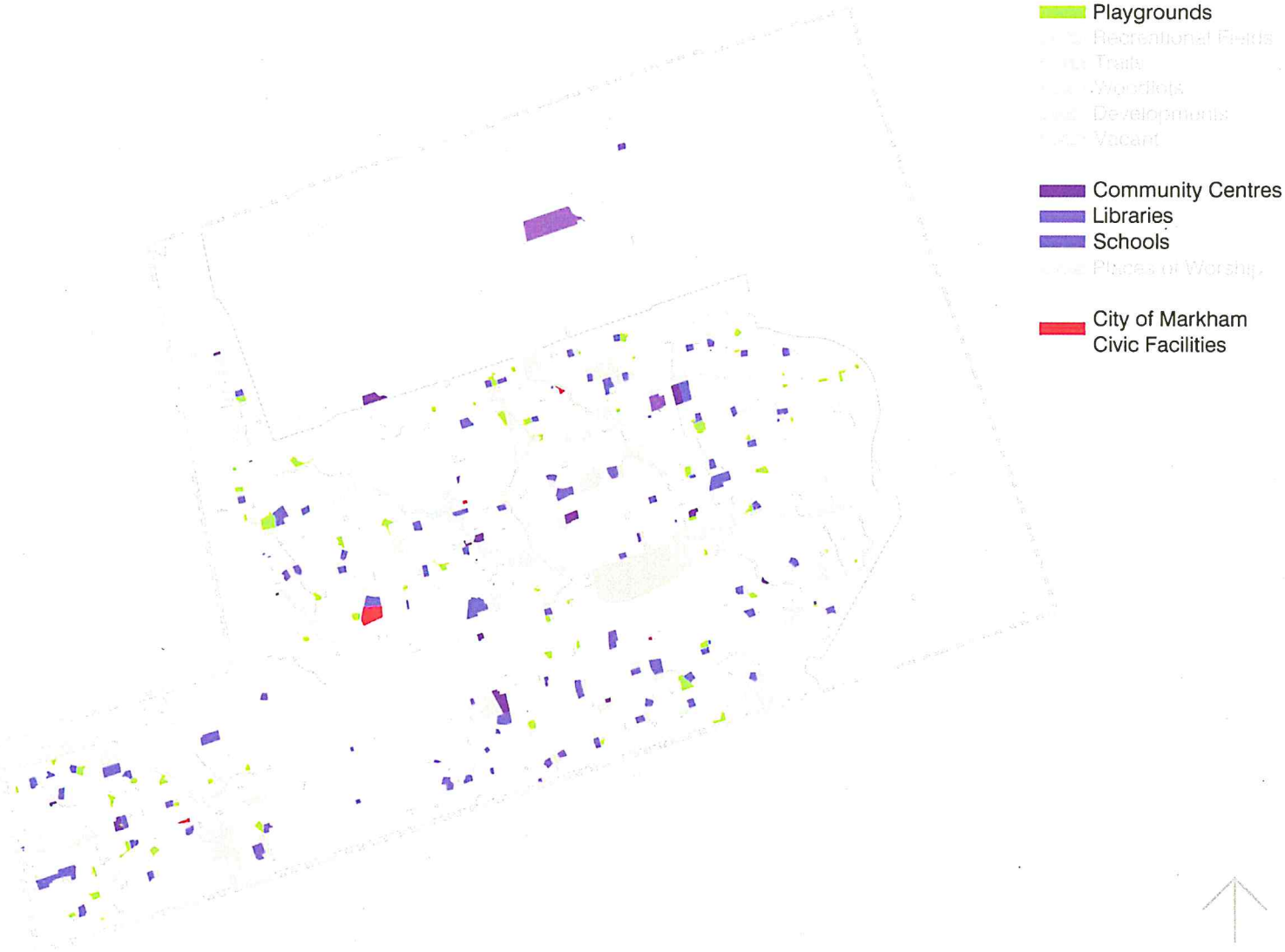
Chelsea Park

June 23, 2012
10:15 am
27 Celcius



The GOOD: Parks & Community Spaces

Markham, Ontario, 2011



The GOOD: Filtering the parks & community spaces for farming

Markham, Ontario, 2011

James Robinson PS

June 24, 2012
9:15 am
25 Celcius

Corner Plaza
Hwy 7 East

June 23, 2012
11:55 am
25 Celcius

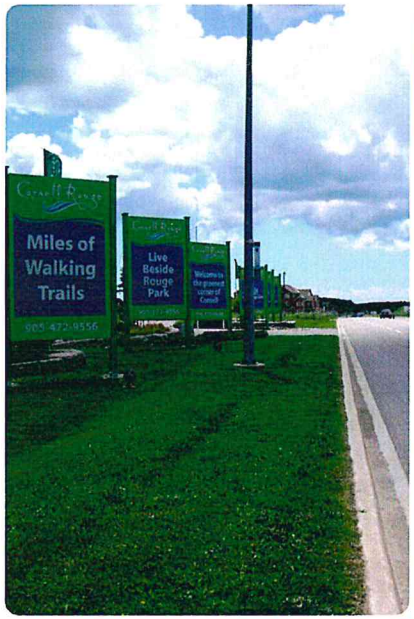
The BAD: Socially Disconnected & Physically Fragmented

Markham, Ontario, 2011

The BAD: The majority is subdivided

Markham, Ontario, 2011

Cornell Rouge



Cornell Centre Blvd.
and Gas Lamp Ln.
June 23, 2012
10:35 am
27 Celcius

The BAD: Designated disconnects

Markham, Ontario, 2011

Major MacKenzie Dr. East

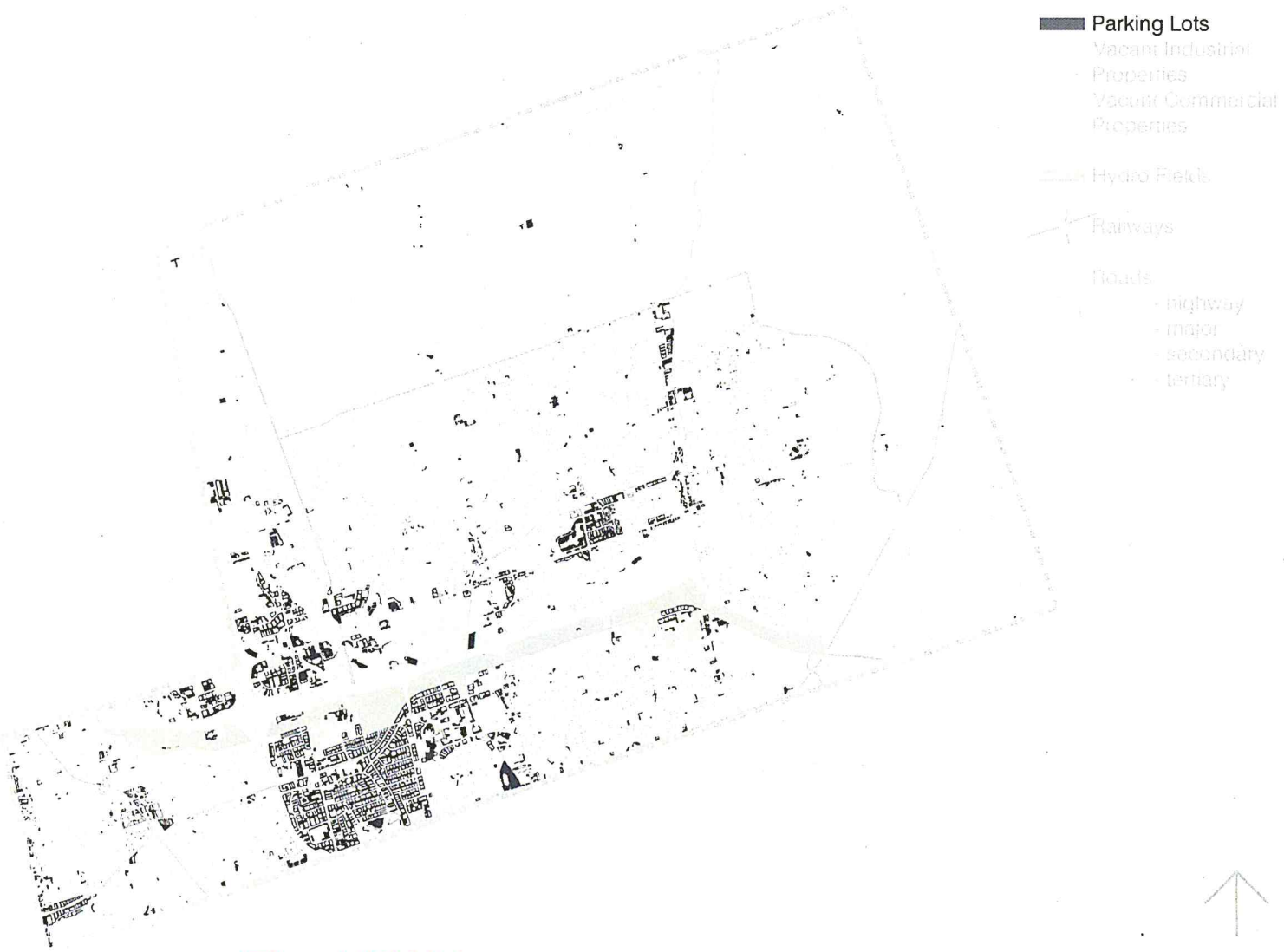
November 11, 2012
1:35 pm
15 Celcius

The UGLY: Oversized & Underutilized

Markham, Ontario, 2011

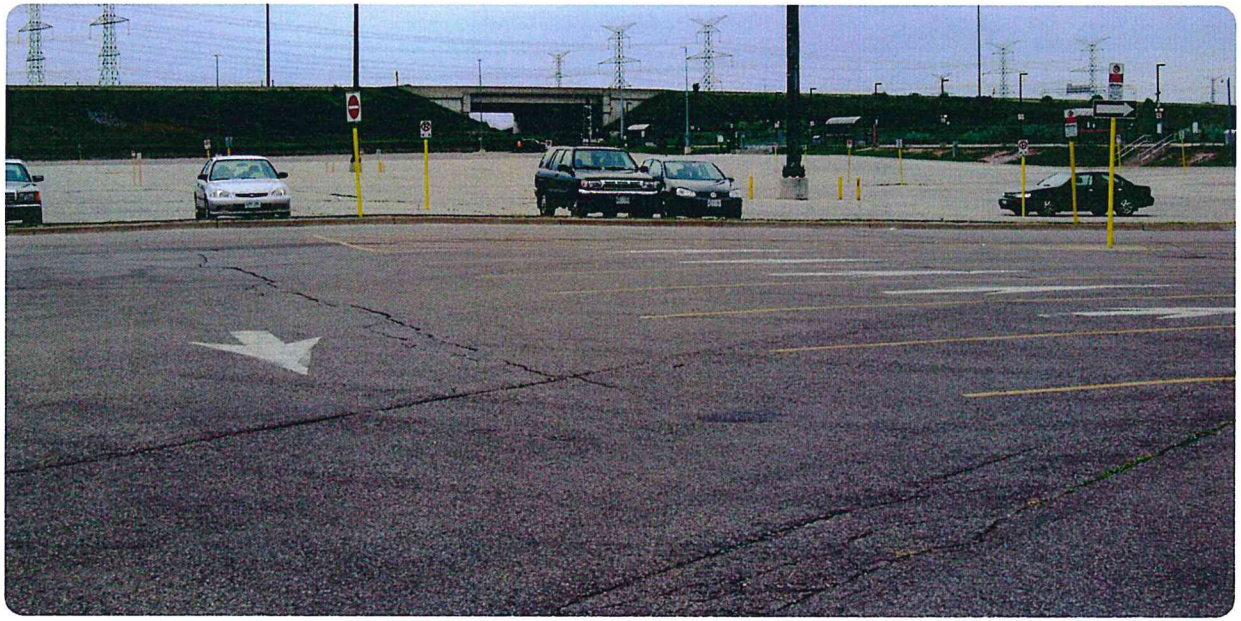
Hydro Corridor

Rodick Rd. &
Hollingham Rd.
June 24, 2012
11:45 am
25 Celcius



The UGLY: Extract the accessible underutilized spaces for markets

Markham, Ontario, 2011



3.4 FARMING SUBURBIA: TYPOLOGY, TERMS & DEFINITIONS

3.4 FARMING SUBURBIA: TYPOLOGY, TERMS & DEFINITIONS

From the D9A urban farming case study research (Chapter 3 - Part 3.2) a Typology Matrix and vocabulary was developed. The Typology Matrix explains the potential user group, scale, and characteristics of each type of food production. It can be used to classify sites for the specific project and site selected. The following pages provide typologies and tools for developing a farmed suburbia anywhere you would like.

The Local food system typologies have their own attributes and can be used to classify sites. The typology can also be used to help find a site that meets a certain criteria. For example if a community organization wants to develop a new community garden or allotments, the matrix specifies that the site needs to be under .5 an acre in size. It will then be the organization's responsibility to manage the community allotments based on specific municipal policies of management. As specified in the typology, renters of plots have the option to market their goods in the larger food system, most typically at a nearby farmer's market. These members would be required to meet all inspections, as other producers and community members do, to be able to sell food at a market.

This example is the same if a municipality is interested in providing fruits and vegetables for a higher percentage of the city's population. The city could meet this requirement either through a new urban or neighborhood farm (FOOD Hub). They would then ask for RFQs from urban farmers who are interested in managing the new proposed farm. This farm manager and their staff would then be required to provide community services, such as farmer training or educational courses on food processing for example.

The following four components are only examples of each type within the Farming Suburbia Typology Matrix.

3.4.1 COMMUNITY/ALLOTMENT FARM

User/Producer/Stakeholder:

Managed by a neighborhood organization, plots rented to community members and managed independently by renter. Rents are paid annually and set by the neighborhood organization in charge of management.

Location/Scale:

The site of a community/allotment garden would be equal or less ½ an acre. The site could be on a public park, on vacant land, or a public housing property.

Characteristics/Scenario:

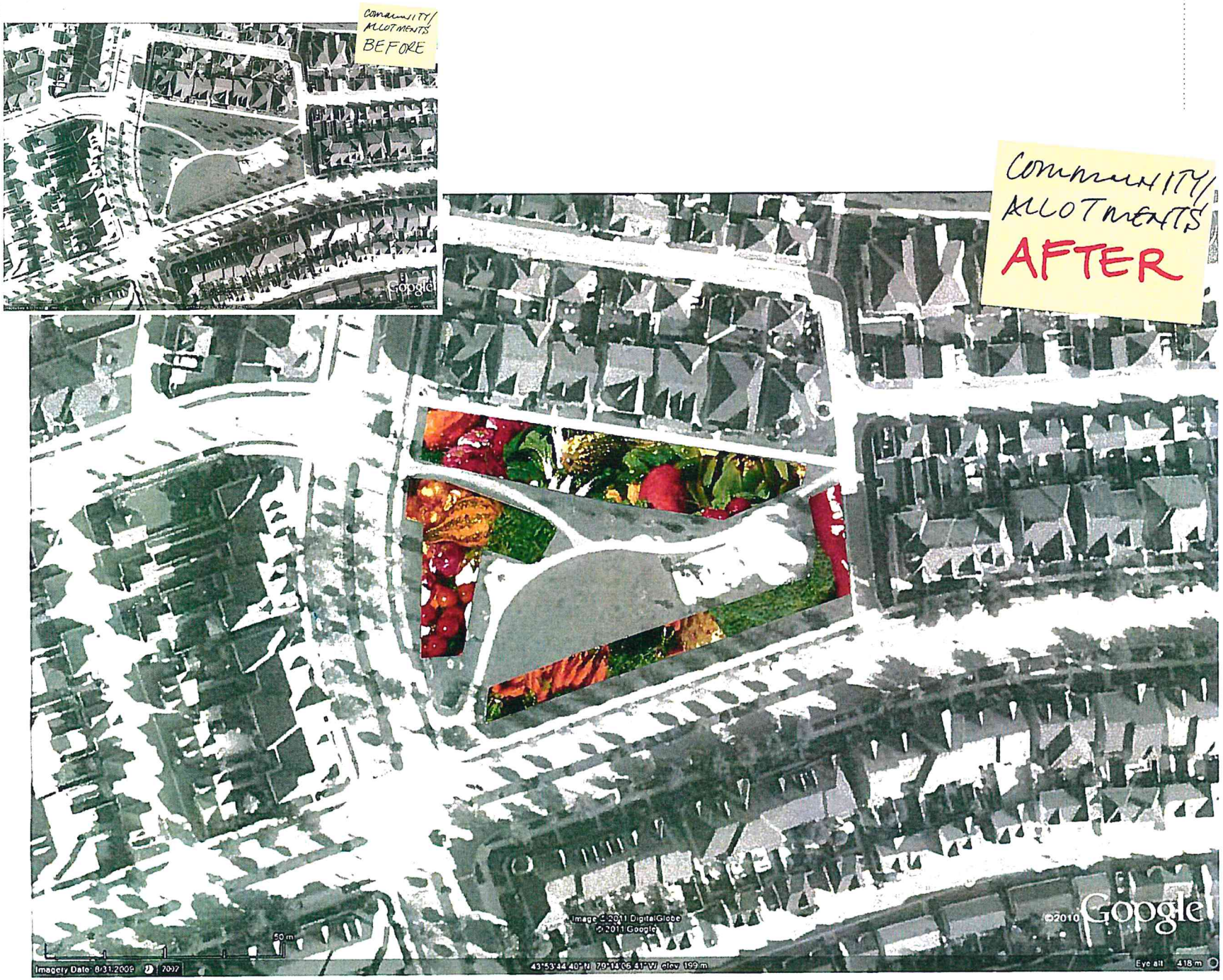
A community/allotment garden would be characterized by multiple individual plots ranging within a variety of sizes. Plots are rented on an annual growing year for the private use of the renter. Tools, storage, and composting would be managed independently or collectively based on the structure created at the time of implementation of the community/allotment garden. Water access would be provided as part of the annual fee to rent a plot. Security would have to be considered.

Production Types:

Food production would be within raised beds, plots, pots and/or on vertical surfaces. Food production would not be limited to crops but also small livestock (ex: poultry). Managed independently for personal consumption/revenue or the community/allotment garden user population could collectively market products for revenue.

Program: (not limited to)

+/- 300 sq.ft plot for each user, storage, composting, above/below grade rainwater collection, outdoor dinning areas.


COMMUNITY/
ALLOTMENTS
BEFORE
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COMMUNITY/
ALLOTMENTS
AFTER
Image © 2011 DigitalGlobe
© 2011 Google
©2010 Google
Imagery Date: 8/31/2009
43°53'44.40" N 79°14'06.41" W elev 199 m
Eye alt 418 m

3.4.2 FOOD BLVD./STREET

User/Producer/Stakeholder:

Managed by a municipal agency, neighborhood or non-profit organization, plots rented to community members or local producer and managed independently by renter.

Location/Scale:

Streets that could be retrofitted are generally not arterial streets, do not have parking along them, are excessively wide, have excessive parking along them, or are streets where parking is located at the rear of the property. The scale of the food production is dependent on the size/area of the street and or boulevard.

Characteristics/Scenario:

Food streets provide a source of circulation for pedestrians and cyclists in addition to a continuous productive landscape. A farmed route can more intensively use a linear landscape that was designed primarily for the car. It can consist of multiple scales as long as production and both modes of transportation are able to coexist. Fencing or other trespassing measures would be dependent on the users of the street. Vertical growing walls could be used in instead of fencing as an example of other options to create boundaries separating the different users of the blvd. All fencing or barriers are required to be transparent to allow for visibility for pedestrians, cyclists and drivers. Small structures meeting local food production guidelines are allowed.

Production Types:

Food production would be within raised beds, plots, pots and/or on vertical surfaces. Food production could be managed independently for personal consumption/revenue or for commercial marketing by a local producer. For a food boulevard to be farmed commercially the production space must be larger than ½ an acre. Dependent on the renter it would be their responsibility to supply storage, tools, and composting facilities. Water access would be provided as part of the design of the food blvd.

Program: (not limited to)

Bicycle and emergency vehicle access, interchangeable paths, storage, composting, above/below grade rainwater collection.

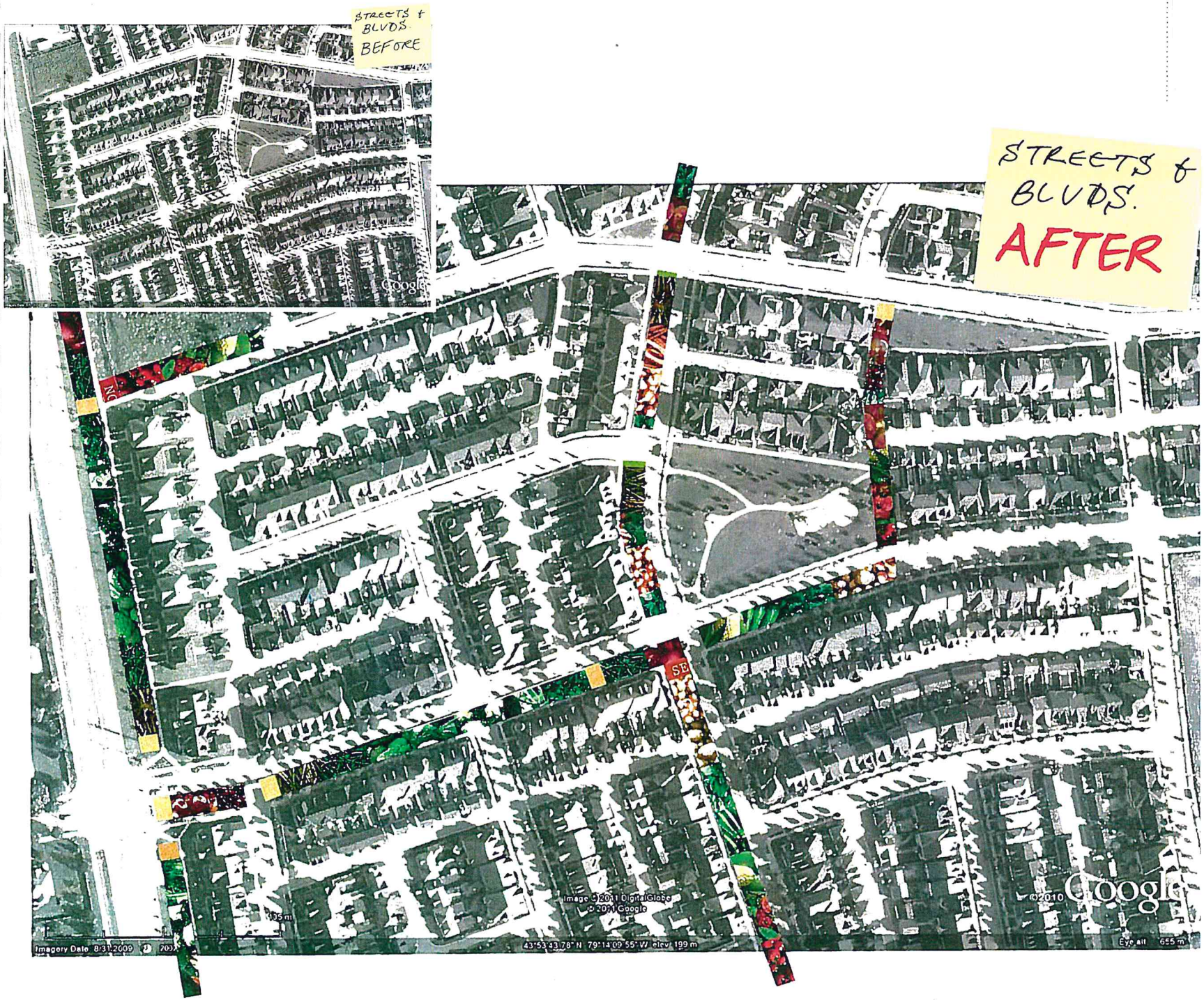
STREETS & BLVDS. BEFORE
STREETS & BLVDS. AFTER
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Image © 2011 DigitalGlobe
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3.4.3 FOOD HUB or NEIGHBOURHOOD FARM
(community centres, libraries, place of worship, schools)

User/Producer/Stakeholder:
Community Centre - Owned by a neighborhood organization, local institution, municipality or private landowner. All production is managed and organized by a local producer.

Not-for Profit - Owned/rented by a not-for-profit organization. Production is managed and organized by the not-for-profit organization that owns/rents the land or in agreement with a local producer.

Religious - Owned by a religious organization. All production is managed and organized by the religious institution and/or a local producer or other joint stakeholder organization.

Education (FOOD Hub) - Owned by a public elementary school or highschool. All production is managed and organized by the institution and/or a local producer or other joint stakeholder organization.

Location/Scale:
A FOOD HUB or Neighborhood Farm ranges between 0.5 - 2 acres. The site could be adjacent to a public park, or vacant land.

Characteristics/Scenario:
A FOOD Hub or Neighborhood Farm would be a source of food production and recreation. Playgrounds and sports courts/fields would be required per neighborhood farm. Community members would be allowed to assist in production with the local producer. Annual neighborhood organization dues would supplement operation costs of the farm.

Production Types:
Food Production would be within hot houses, rotational plots, aquaculture, raised beds, pots and/ or on vertical surfaces. Production would not be limited to crops but also small livestock (ex: poultry). Production could be managed for commercial marketing as part of a CSA, farmers market or local food market. It would be the farm's responsibility to supply water, storage, tools, and composting facilities.

Program: (not limited to)
Rotational plots, fruit trees, chicken coops, greenhouse, storage, processing, market, outdoor dinning, above/below grade rainwater collection, composting.


NEIGBOURHOOD FARM BEFORE
NEIGBOURHOOD FARM AFTER
Google
Image © 2011 DigitalGlobe
© 2011 Google
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3.4.4 URBAN FARM

User/Producer/Stakeholder:

Owned by a local institution, municipal government or local landowner, production is managed and organized by a local producer.

Location/Scale:

A "city farm" would be greater than 2 acres or a city block. The farm would be located within diverse urban area of multiple land uses. This would provide equal access by community members and provide a substantial amount of fresh produce and goods to the community.

Characteristics/Scenario:

A "city farm" would be a source of food production and a center for a market or local food processing. Playgrounds, sports courts/fields, trails, and other recreation could be additional amenities per city farm. The local producer and farm management staff would be in control of all operations. Annual municipal taxes would supplement operational costs of the farm.

Production Types:

Production would be within hot houses, rotational plots, aquaculture, raised beds, pots and/ or on vertical surfaces. Production would not be limited to crops but also small livestock (ex: cows, poultry, and sheep). Production would be managed for commercial marketing as part of a farmer's market or local food market. It would be the farm's responsibility to supply water, storage, tools, and composting facilities.

Program: (not limited to)

Rotational plots, fruit trees, livestock, chicken coops, greenhouse, storage, processing, market, café or restaurant, wetlands, recreational trail, above/below grade rainwater collection, composting.


URBAN FARM BEFORE
URBAN FARM AFTER
Sawyer Crescent
Finchan Ave
Fry St
Birdlip Crescent
Kirkhill Ave
Amira Ave
Christian Resson Park Ave
Donald Cameron Ave
Cornell Meadow Ave
Cornell Common Pl
Cornell Park Ave
$
$
Image © 2011 DigitalGlobe
© 2011 Google
Google
Imagery Date: 8/31/2009
43°53'29.16" N 79°14'10.54" W elev 197m
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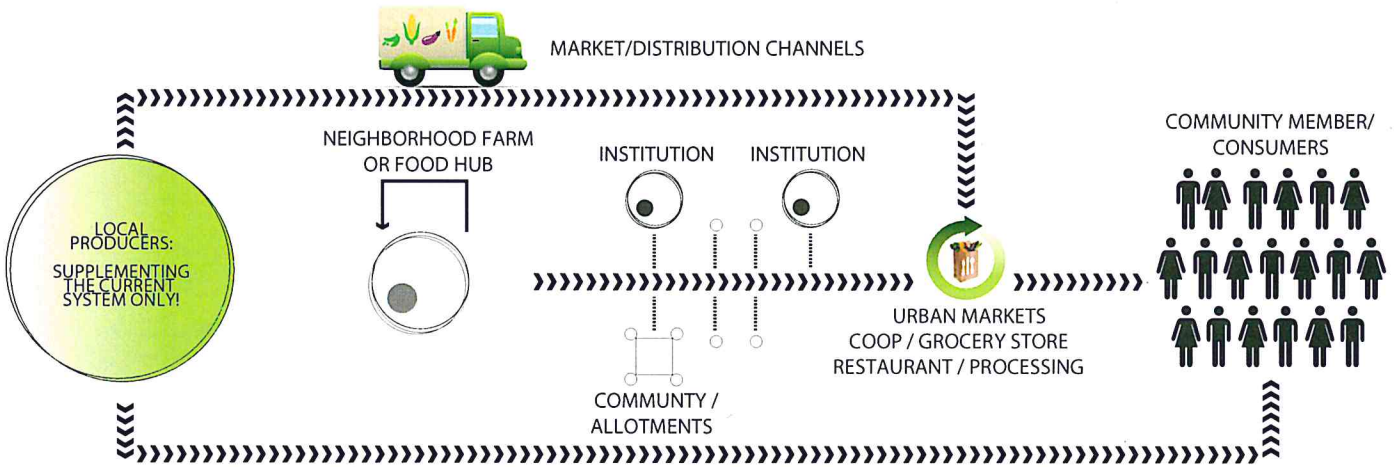
CURRENT INDUSTRIAL FOOD SYSTEM FLOW DIAGRAM for the GTA

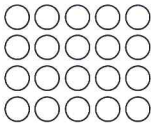
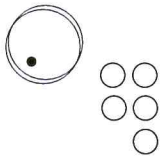
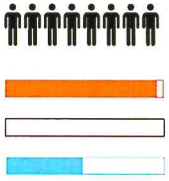
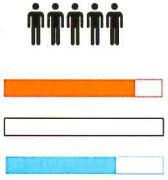
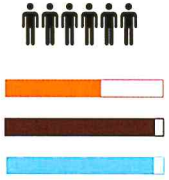
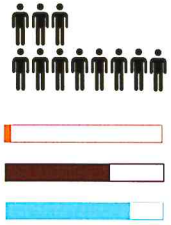
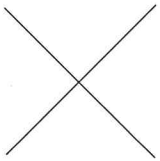
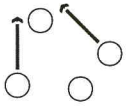
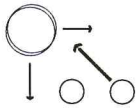
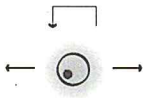
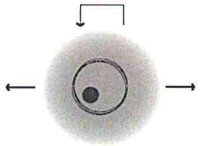
PROPOSED LOCAL FOOD SYSTEM
NEW TYPOLOGY



COMPONENTS

TYPOLOGY	PRIVATE RESIDENCE LOT	COMMUNITY/ ALLOTMENTS	FOOD BLVD.	NEIGHBORHOOD FARM	URBAN FARM

FARMING SUBURBIA TYPOLOGY MATRIX

	PRIVATE RESIDENCE LOT	COMMUNITY/ ALLOTMENTS	FOOD BLVD./STREET.	NEIGHBOURHOOD FARM or FOOD HUB	URBAN FARM
USER/PRODUCER/ MANAGER INDEPENDENT USER LOCAL PRODUCER INSTITUTION (RELIGIOUS, EDUCATION, NON-PROFIT)					
SCALE PRODUCTIVE SPACE	 VARIES	 >0.5 ACRES	 VARIES	 0.5 - 2 ACRES	 2+ ACRES
CHARACTERISTICS STAFF UTILITIES / INFRASTRUCTURE PROVIDED # OF COMMUNITY SERVICES % PUBLIC					
PRODUCTION TYPES EXISTING STRUCTURE SUPPORTING FACILITY GREENHOUSE MARKET CIRCULATION					
DISTRIBUTION/ MARKETS OPTIONAL DIRECT					

TERMS & DEFINITIONS

For the purpose of this thesis project farming suburbia, the terms and definitions are as follows;

Urban Agriculture: Agriculture which occurs within the city.

Local food production:

- Organic agriculture.
- Seasonal consumption.
- Local growing, processing, marketing and trading of food.

Also, seasonal and local food:

- Is basic or core, backed up or supplemented by the globally based food system.
- Is dependant on local climate and conditions for growing period, and uses minimum of artificial stimulants, i.e. a greenhouse might be used to extend the growing season, but heating and manufactured growth promoters are avoided.
- Can contribute to a reduction of imported food.
- Is not going to replace all imports of produce.
- Is an alternative to a multitude of semi-ripe imported crops currently available in developed countries.

Community Supported Agriculture (CSA): form of marketing by a producer where a family or individual purchases a share annually at the time of planting in return for a share during the harvest each week; producer and shareholders shares the risk together in this agreement.

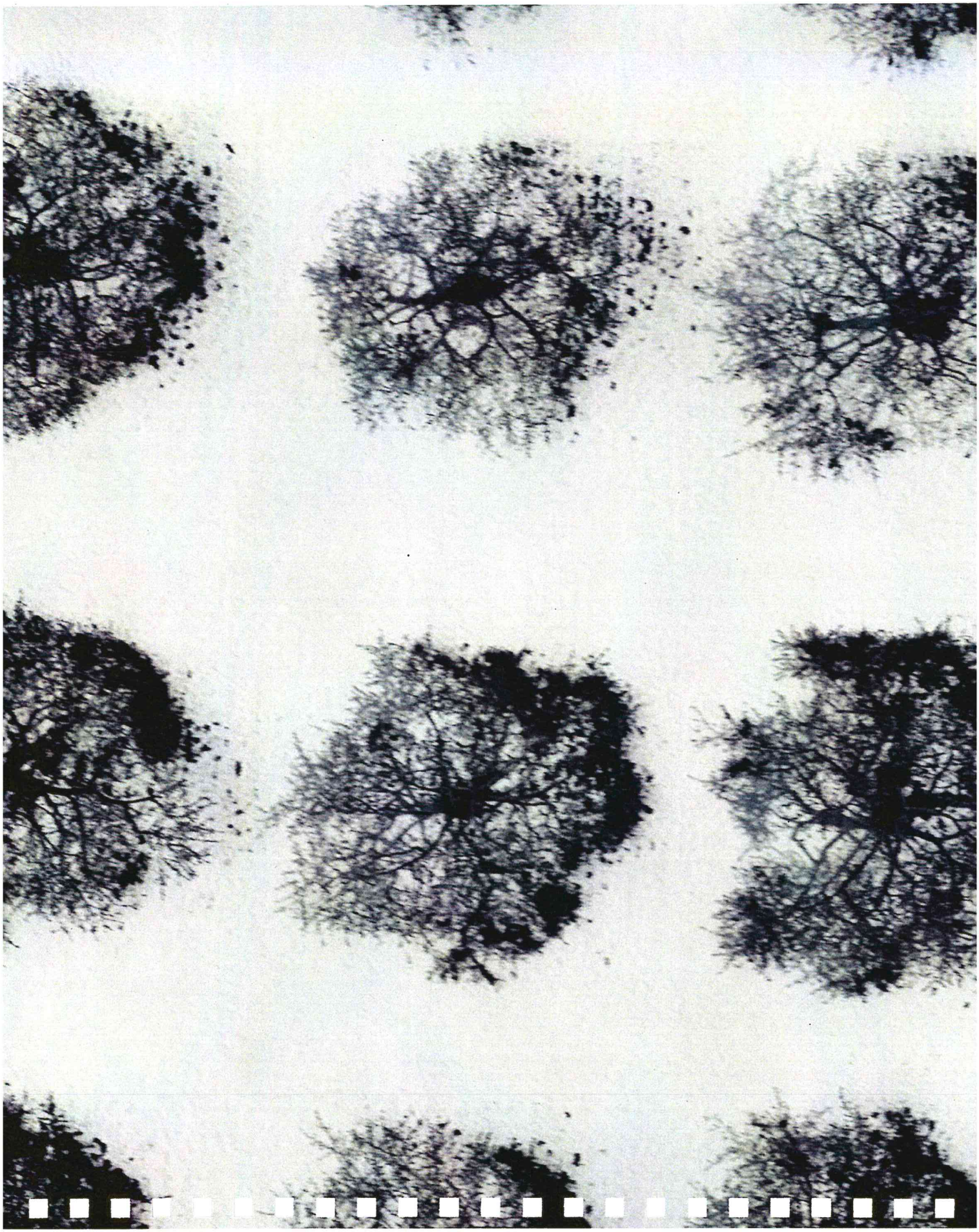
Food miles: the average distance food has been transported between production and consumption.

Food security: giving populations both economic and physical access to a supply of food, sufficient in both quality and quantity social level and income (Andre Viljoen 2005)

Land Trust: an agreement where by one party (trustee) agrees to hold ownership of a piece of real property for the benefit of another party (beneficiary)

Not-for-profit: solely to provide programs and services that are of public benefit that are otherwise not provided by local, state and federal entities.

CHAPTER 4.0: COMMUNITY COMPANY

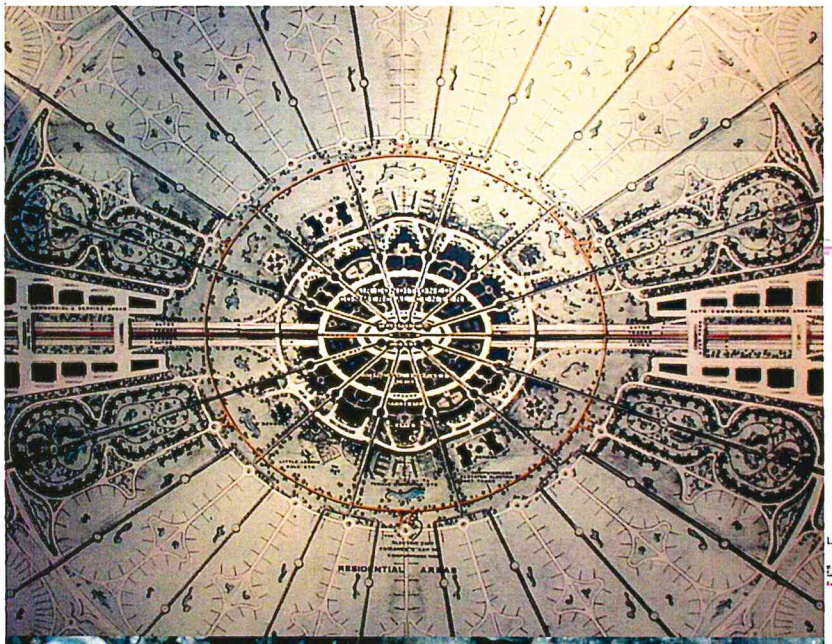


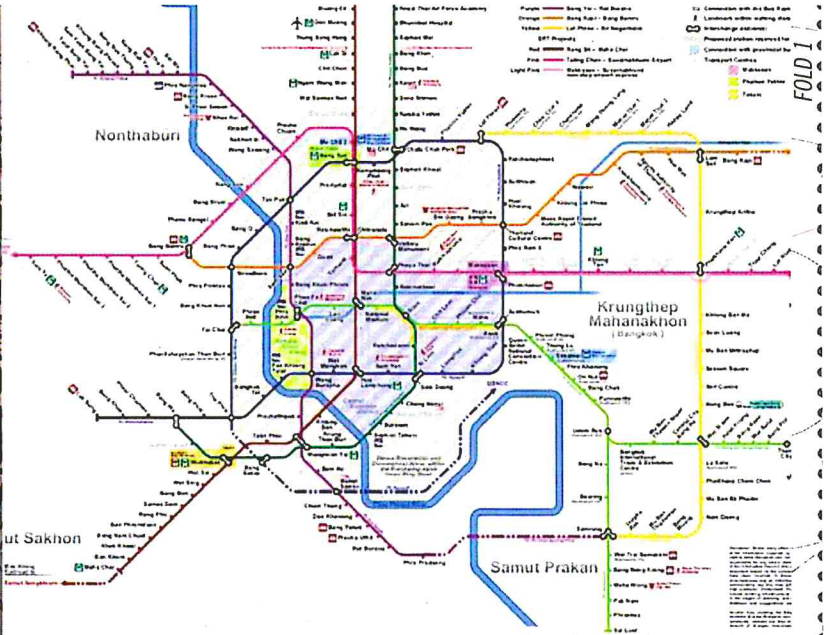
4.1 COMMUNITY COMPANY

"The importance of communal eating is clear in all human societies. Holy communion, wedding feasts, birthday parties, Christmas dinner, an Irish wake, the Sunday family meal are Western and Christian examples, but every society has its equivalents."

— CHRISTOPHER ALEXANDAR et al., A PATTERN LANGUAGE

SOURCE: Apple Trees After Spring Snowstorm, Clinton, Massachusetts, © 2010 Alex S. MacLean/Landslides

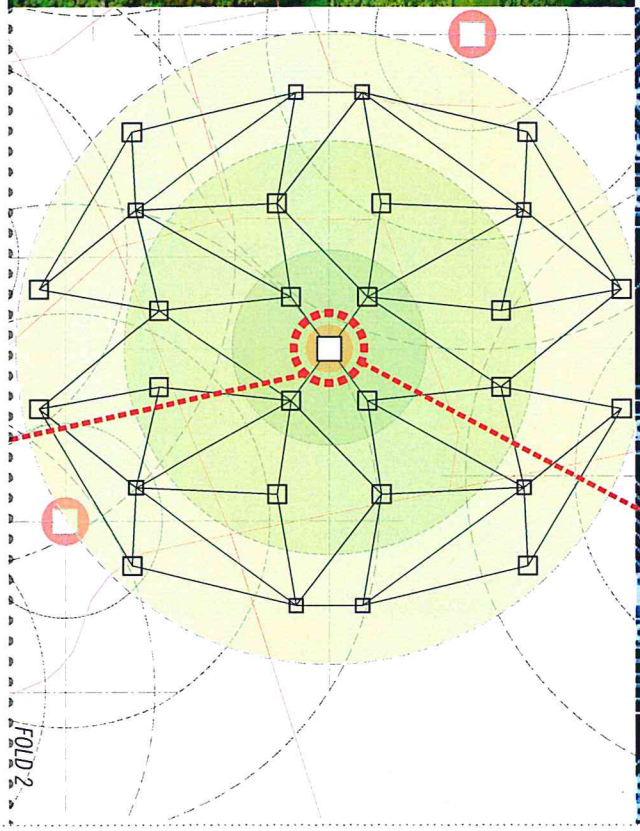




FARMING SUBURBIA:

Community Company*

(*from Latin. com - “with” + panis “bread”.)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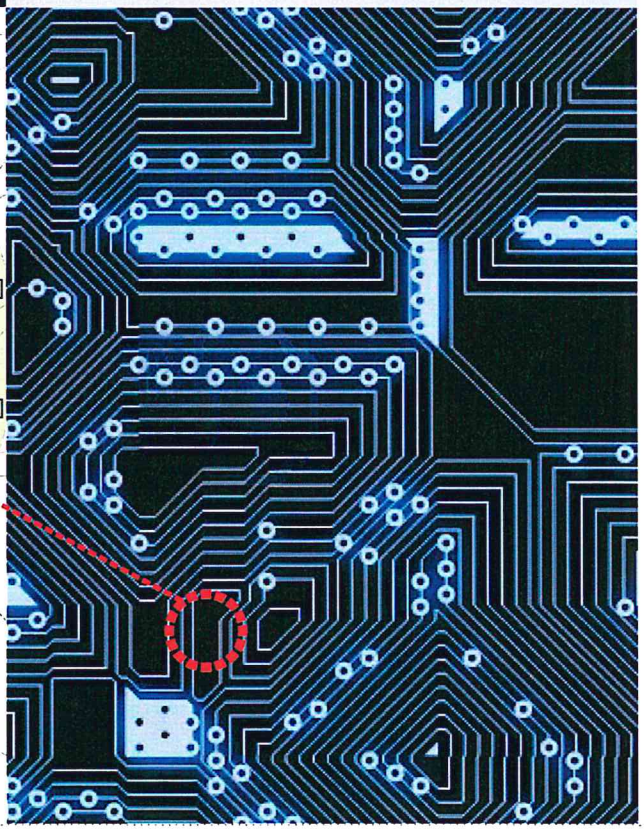


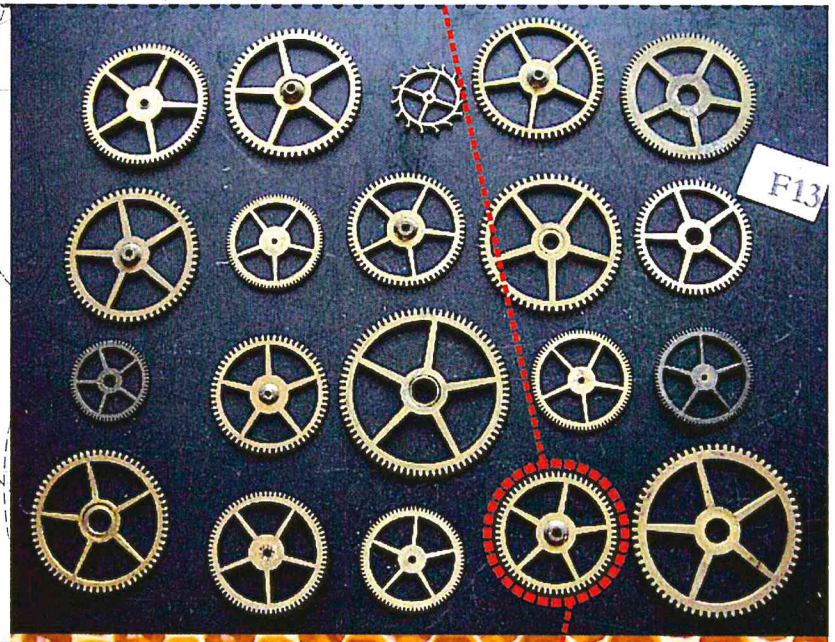
Community Company is the conceptualization of Food as infrastructure or a public utility. A comprehensive City infrastructure, which would provide a collective network and supporting nodes with cellular units that can be added and relocated dialy, monthly, seasonally, and has the ability grow over time.

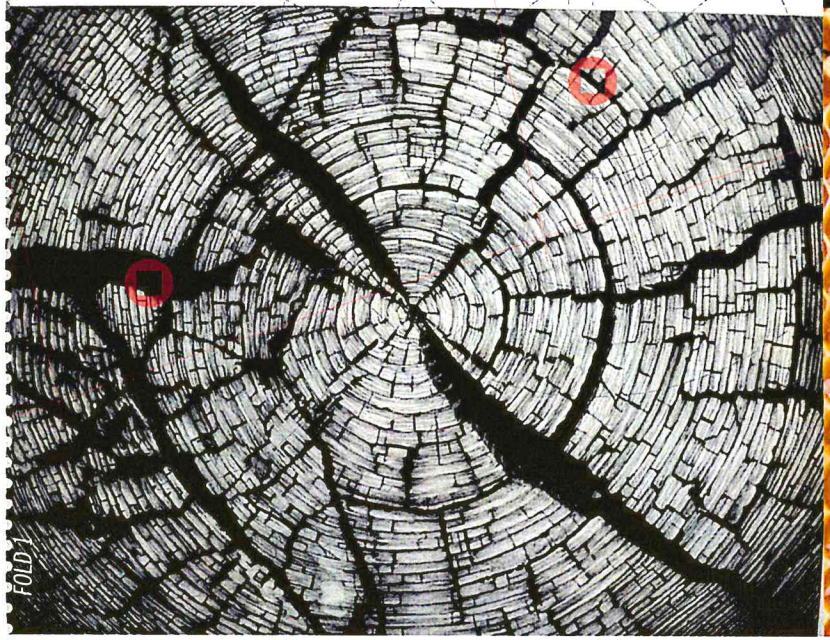
PHASE 1 - Develop and assemble coordinated infrastructural components of the local food system:

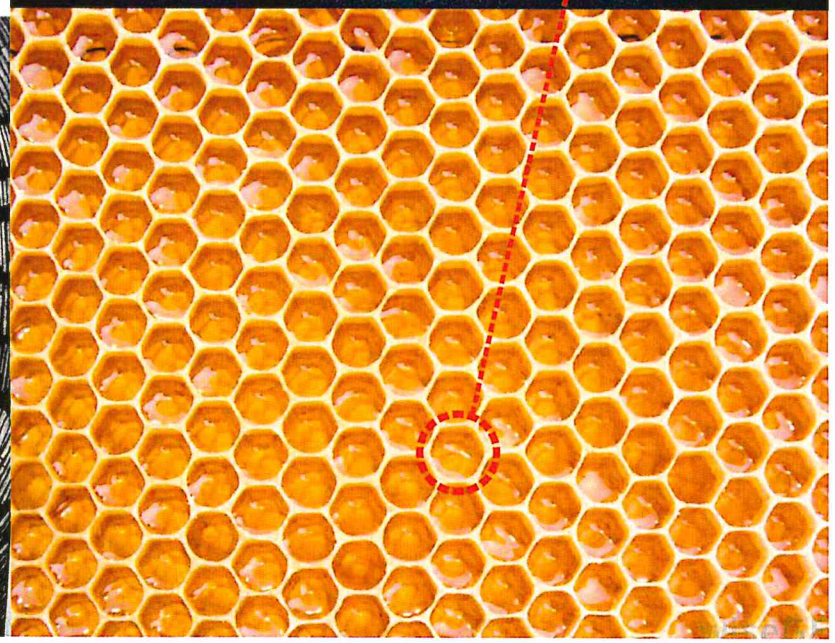
1. FOOD DISTRICTS or ZONES
2. FOOD Hubs
3. Production, Distribution, and Consumption Nodes

PHASE 2 - Provide cellular containerized units from that infrastructure:

1. GREENHOUSE Module
2. BARN/MARKET Module
3. DINING PAVILION Module







Community Company acknowledges acknowledges that food has the potential to be a public service or good. This opens the doors for government incentives (tax-breaks, leaseholds, use of existing resource infrastructures such as water, composting services, etc.) to ensure more equitable distribution and access.

Current urban agricultural efforts, while broad in vision and scope, lack both the will from municipal levels of government and the infrastructure necessary for meaningful change. An interconnected model, which uses existing land and resource infrastructures (i.e. public schools, public parks, easements, retail parking lots, etc.), may be the way to create a network of local food systems. Community Company would allow available public land to become arable, private land to be capitalized, and year-round seasonal processing methods to promote local food access while stimulating social cohesion.

The groundwork has already been laid for the implementation of a proposal that will generate networked and localized food systems. For example, cities such as Minneapolis, Minnesota and Vancou¬ver, British Columbia, have initiated "Urban Agricultural Policy Plans". They have taken the first steps by con¬ducting thorough urban land inventories that document existing public plots that have potential for urban agriculture. Moreover, Oakland, California and Toronto, Ontario have developed Food Policy Councils to work towards a comprehensive secure and local food system. However, while existing policy recommendations all acknowledge the need to reconsider zoning strat¬egies, none to our knowledge has developed prototype zones or district maps based on proximity and proliferation of a local food system-related program. Also, policies are needed to incorporate all three components (processing, distribution and consumption) as part of necessary land-allocations.

This proposal has the potential to return food security to the communities that are currently detached from their means of food production. Equalizing distribution and providing important infrastructure for local food systems would create food production in tune with local demand; distribution that is efficient and equitable, and a sustainable food supply for local consumers.

The infrastructural components that support the local food system are:

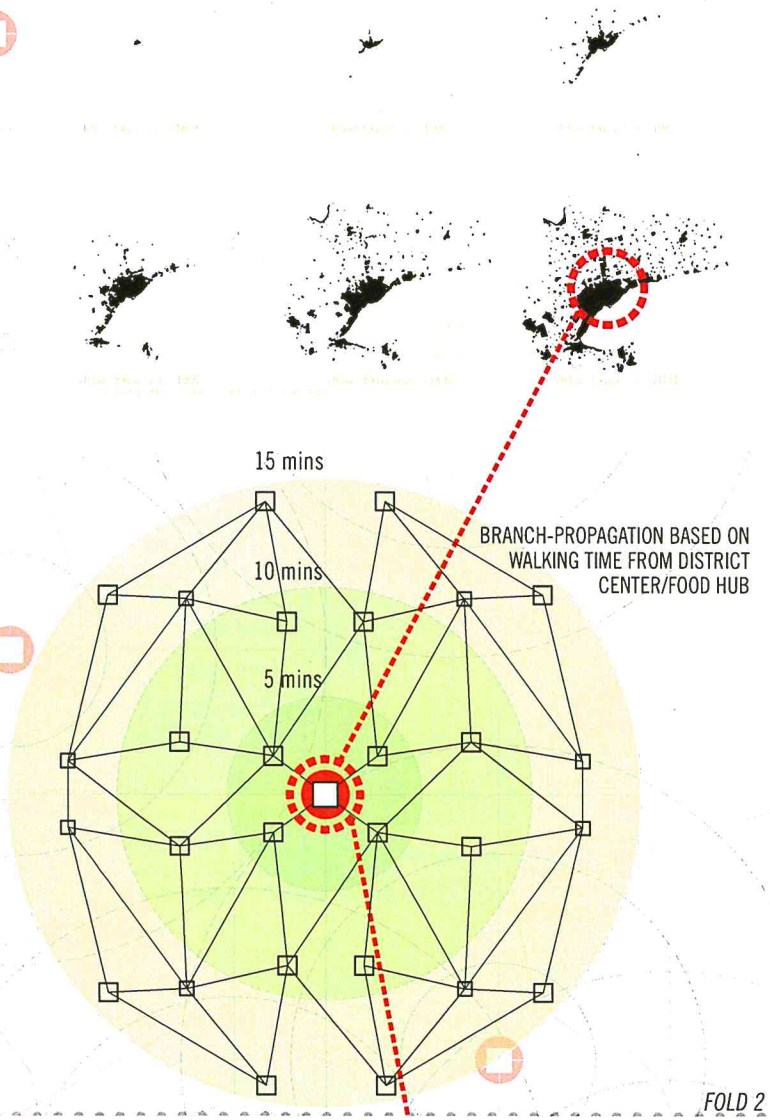
1. DISTRICTS or ZONES: Re-organize suburban land into Food Districts [FD] through the re-drawing of zoning maps. Exist ing land will be rezoned to support farming land-use and appropriately-located FOOD HUBs and Production, Processing/Distribution and Consumption nodes (PDCs see below).

2. FOOD HUBs: Establish a Public Farm and Market network throughout the city. Using the existing public school infrastructure, locate markets and support infrastructure on a by school neighbourhood basis.

Graft onto the good of the public schools -

a. learning,
b. socialization &
c. socializing

3. PDCs: Localized Production, Processing/Distribution and Consumption nodes within an immediate district (= 15 to 20 minute walking proximity from FOOD HUB). These nodes allow "just-in-time" delivery methods and are part of a system of transfer nodes that can extend beyond the school neighbourhood, community and city, should the need arise.



FOLD 2

FOOD DISTRICT MAPPING GUIDE*

use + size + radial distance from FOOD HUB = system use/program allocation

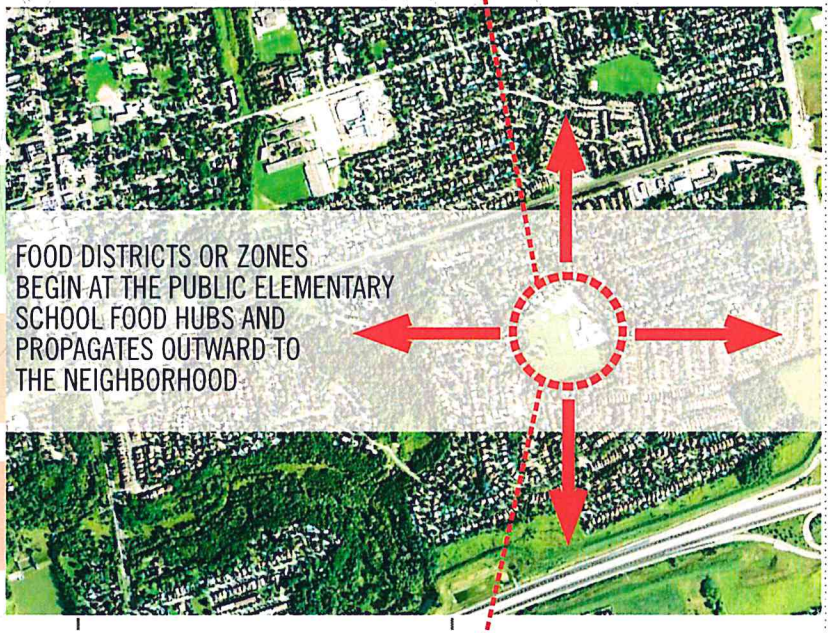
minimum ideal PROGRAMMING (based on reasonable population and access/proximity projections):

land size key (acres)
<0.5 - small
0.5 to 2.0 - medium
+2.0 - large

		total/distance zone
Food Hub (greenhouse + public market + classrooms)	medium	--
Production		
P1	small	1/D1, 1/D2, 2/D3
P2	medium	1/D1, 2/D3
P3	large	1/D2
Distribution		
M1	small	1/D2
M2	medium	1/D3
M3	large	1/D3
Consumption		
C1	small	1/D1, 2/D2, 1/D3
C2	medium	2/D2, 1/D3
C3	large	1/D3

* The system is based on the following assumptions pertaining to the City of Markham within the GTA:

a. An average elementary school boundary includes approximately 1700 households, equals 5780 people/elementary school boundary (3.4* people/household average, 2006 Statistics from Statistics Canada Website).
b. approximately 1100 sq.m area can provide one household with 25% of their food.
c. Therefore small-scale urban agriculture is only ONE piece of a sustainably local food system that must be encouraged by zoning allowances that support all aspects of a relational food network (including Production, Distribution, Processing, and Consumption).

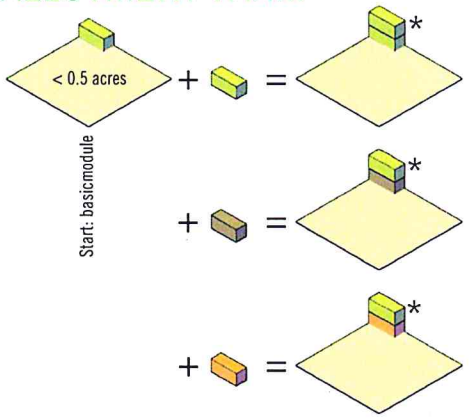


FOLD 1

Community Company has the opportunity to process and distribute all of its own products within each food district. However, as more food districts are developed over time, distribution and networking to adjacent districts is highly recommended. The processing may include but is not limited to: sanitization and temporary storage of fruits and vegetables; preservation of foods for low-production months; development of value-added products (such as jams, chutneys etc.); and the processing of small-scale livestock. The processing and packaging of food (when required) shall be done immediately after harvesting in the appropriate Module located at each node within the food district.

Essentially the nodes identified in the Food District Mapping Guide are to sync with the objectives of the module(s): adaptable, flexible, sited temporarily with the seasons, therefore portable and positioned as the architectural partner of the locavore movement. The Modules play an important role in Community Company because they function for various activities such as, growing, harvesting, collecting, composting, packing, curing, preserving, teaching, retailing, marketing, community meetings, cooking, dining, picnicking, dancing, and supporting seasonal events. On the opposite pages a menu board of modules shows examples of the hundreds of possible combinations.

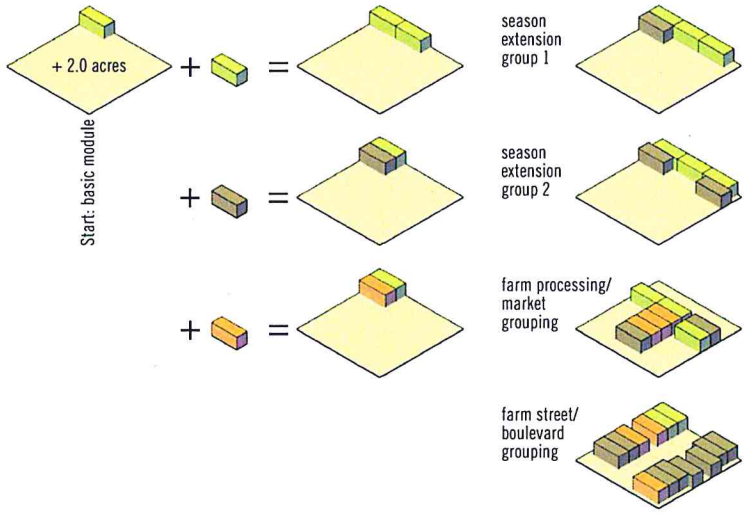
ALLOTMENT FARM



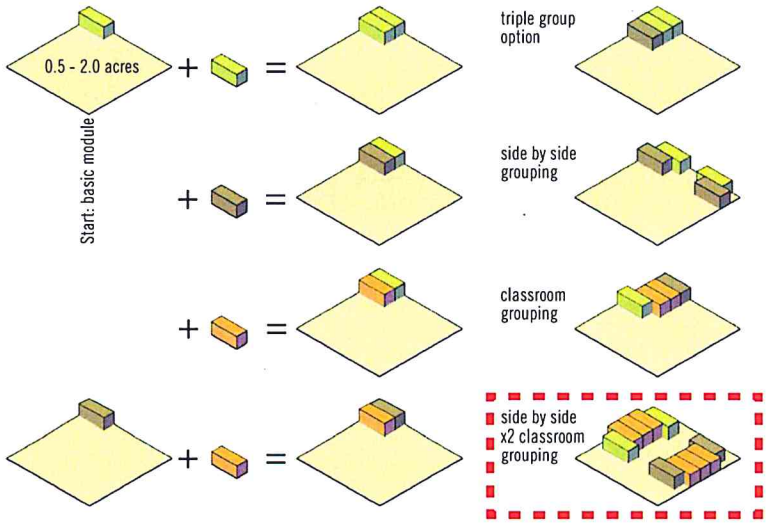
*stacked modules option for smaller production land areas.

-greenhouse module must be placed on top for solar harvesting

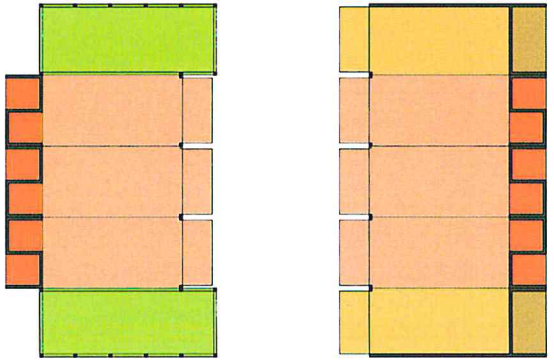
URBAN FARM



FOOD HUB @ SCHOOLS



x2 CLASSROOM
functional area diagram



FOLD 1

The three modules relate respectively to localized Production, Distribution and Consumption stages or nodes and shall include, but are not limited to the following requirements:

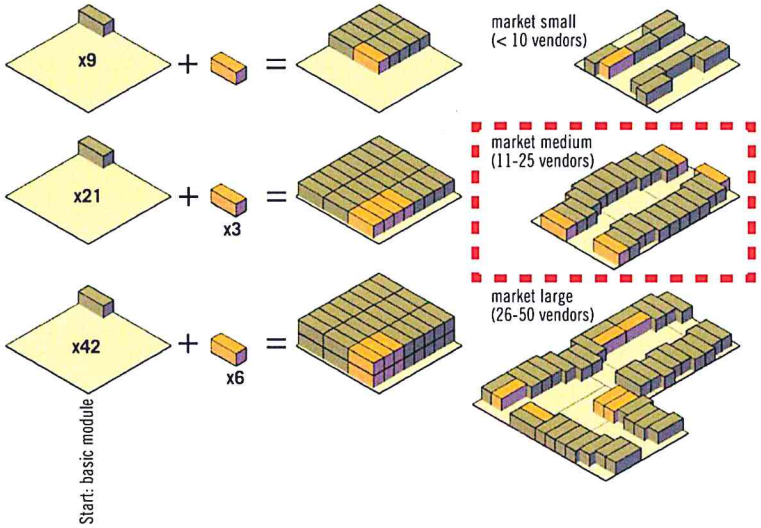
PRODUCTION: Greenhouse Module

To be used for the year-round production or seasonal extension of certain fruits and vegetables, as well as for pre-season seedling growth. They can stand alone at allotment farms, where tool access is available at nearby residences, or they should be located adjacent to the Barn/Market Module for the use of tools, equipment, storage and any processing needs. Standard to the Greenhouse Module, is a perimeter shelving system to keep a center path clear.

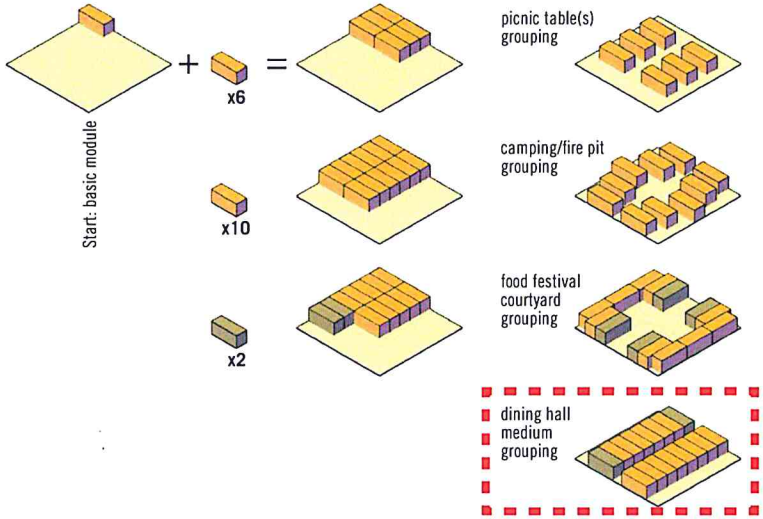
DISTRIBUTION: Barn/Market Module

To create and support social civic space. Places where the whole of the community may gather for meetings, markets, events, educational activities, festivals, weddings, dinners, etc. The module should be as intimate as a backyard gazebo when used alone. Then when either connected with a barn/market module for food vending or itself, it can grow large enough to support festivals. Standard to each Barn/Market Module, is a small hand wash sink, tool storage and food waste collection.

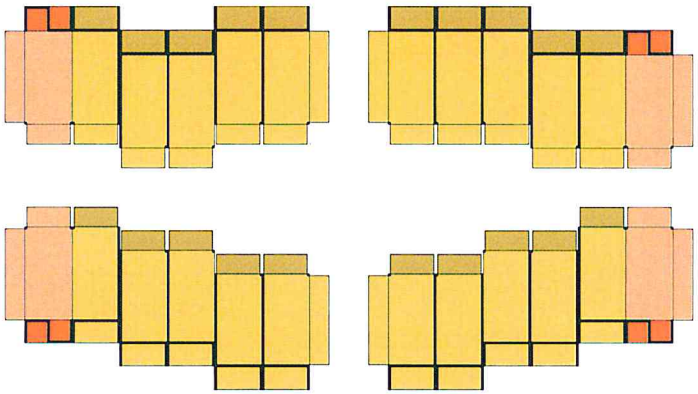
MARKETS



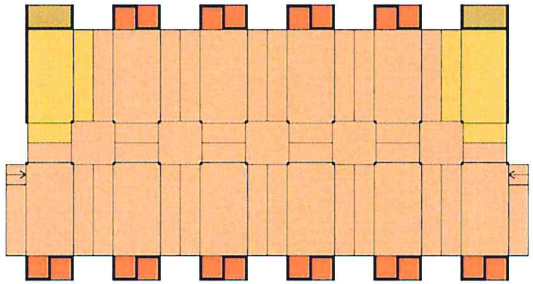
DINING PAVILIONS



MARKET MEDIUM (11-25 vendors)
functional area diagram



DINING HALL
functional area diagram



FOLD 2

The following list is not in sequential order but it identifies some of the functions required:

1. PRODUCE PROCESSING - facilities in which the seasonal preparation of vegetables and fruits occurs, as well as creating value-added products for markets and distribution. There is an option for conversion to a kitchen (food truck equipment) to facilitate the canning, pickling, drying, sugaring etc. of produce.

2. SMALL LIVESTOCK BARN – to include but, not limited to, chicken-coops, rabbit-hutches, shelters for wildfowl, etc.

3. LIVESTOCK PROCESSING – include but not be limited to the curing, smoking, pickling, salting etc. of meats and/or poultry.

4. HARVESTING – include all necessary equipment for initial cleansing of produce direct from the field; this includes washing sink or hose bib and drying stations. Locate within the module or exterior hose connection to exiting services or rainwater barrel. The interior should be easily accessible and open to the air but covered from above for the user's comfort.

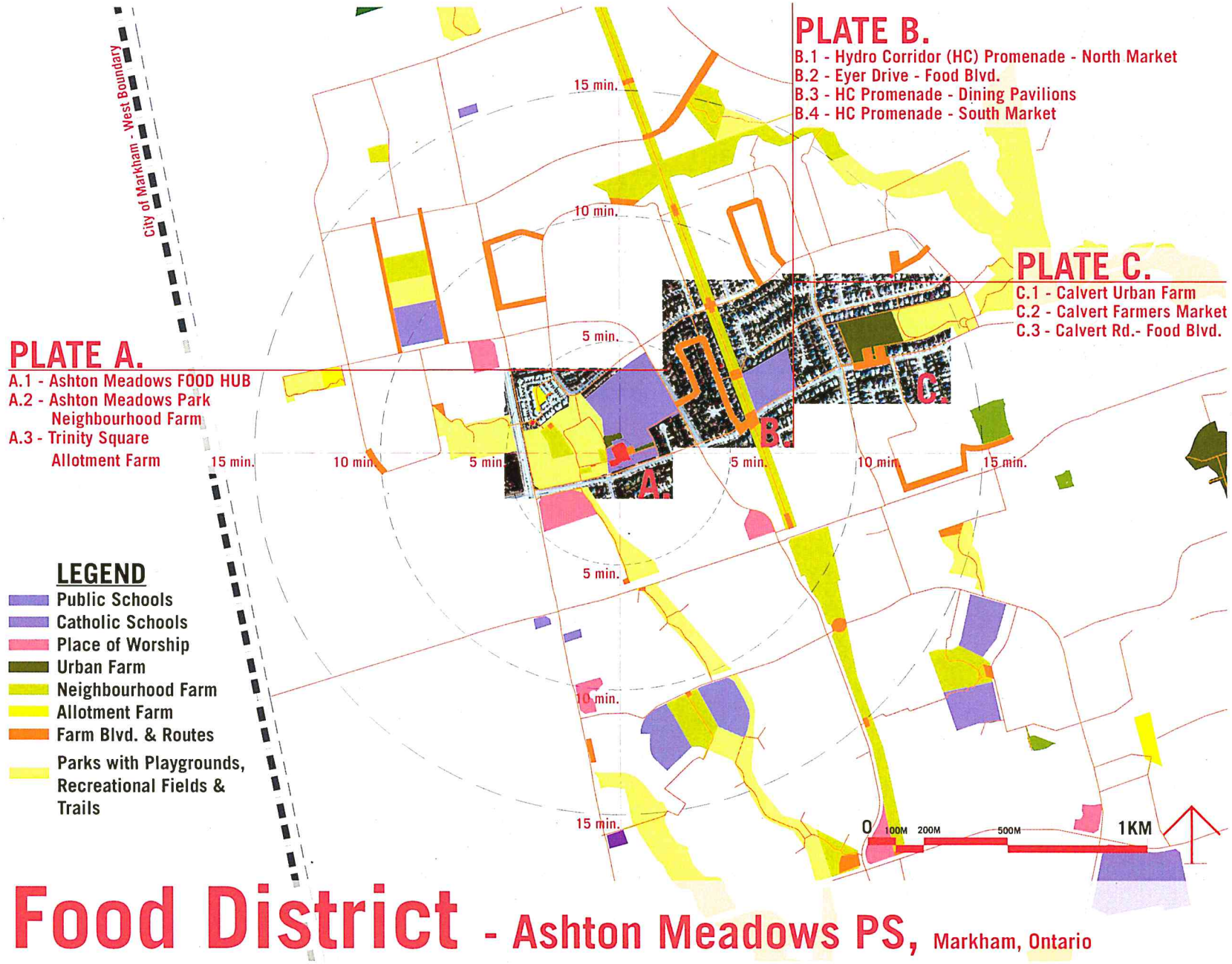
5. COMPOSTING – for collection by the existing waste infrastructure and return to the soil of Community Company. Locate within the module for collection of crop or food waste to create a valuable soil resource for distribution amidst the food district allotment or farming plots.

6. EQUIPMENT STORAGE – should be capable of housing all necessary tools for the planting, tending, and harvesting of crops, as well as any auxiliary tools that would be required in the agricultural production. A module could be designated entirely for equipment or lockers. Another option, when several modules are in use together, the equipment can be divided in separate storage areas.

7. TEMPORARY STORAGE – to be located adjacent to the harvesting and cleaning processes, this is to expedite field to storage procedures, in order to maintain freshness of produce.

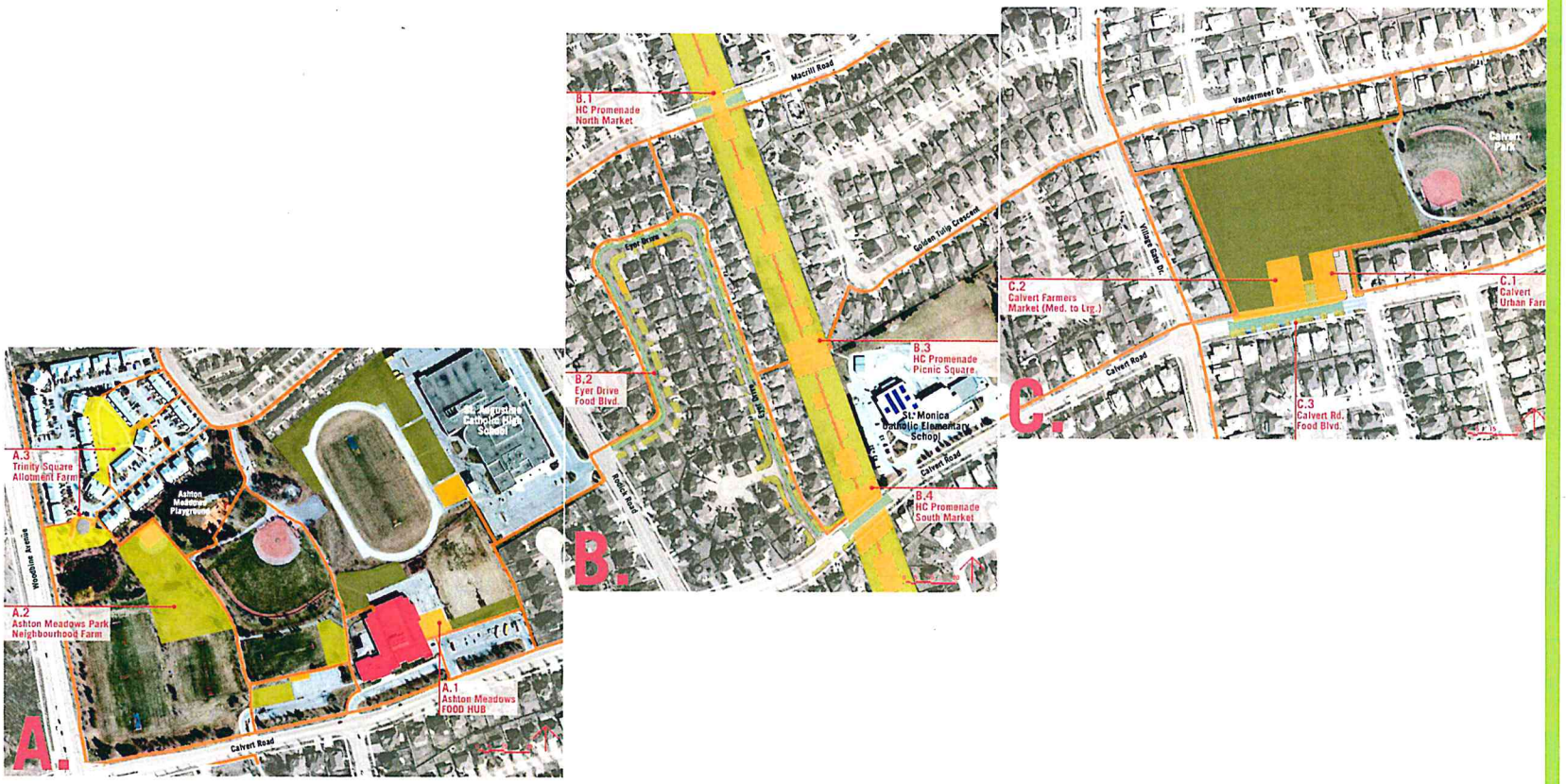
CONSUMPTION: Dining Pavilion Module

When site size is available, or large enough at each node of the food district, this module is used to create and support social civic space. Places where the whole of the community may gather for meetings, markets, events, educational activities, festivals, weddings, dinners, etc. The module should be as intimate as a backyard gazebo when used alone. Then when either connected with a barn/market module for food vending or itself, it can grow large enough to support festivals. Standard to each Dining Pavilion Module, are table and chairs (seating 8 minimum), a small hand wash sink, and food waste collection.

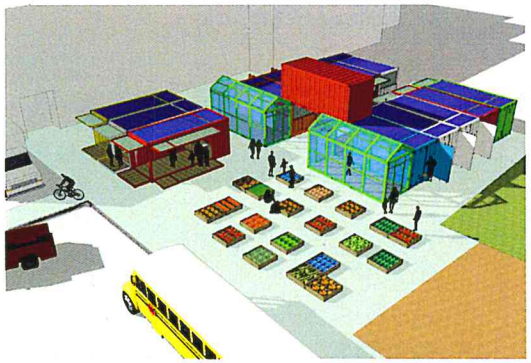


Food District - Ashton Meadows PS, Markham, Ontario

4.2 LOCAL FOOD SYSTEM 2020

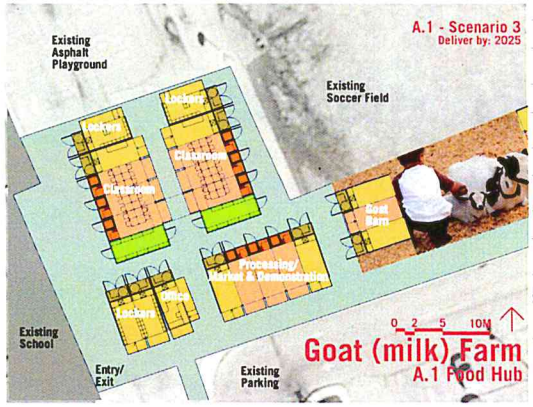


4.2 LOCAL FOOD SYSTEM 2020

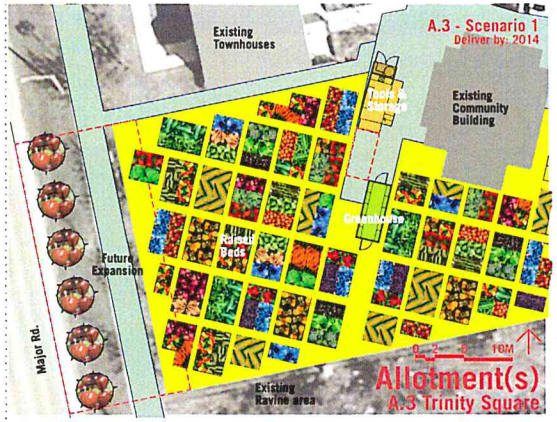


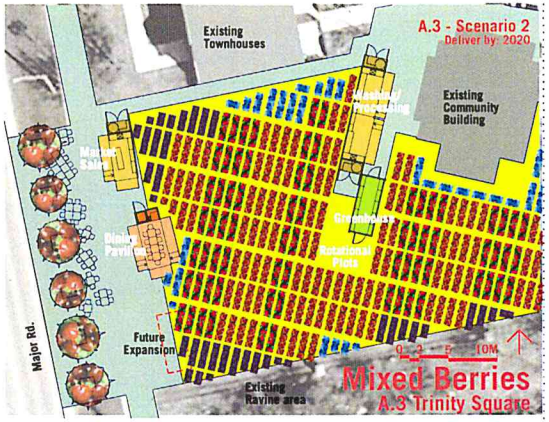
It is the start of a school year, September 2012 and the principal calls an assembly to announce that Ashton Meadows Public Schools' application to be a FOOD Hub has been approved! This was made possible through the partnerships of The Markham Sustainability Office – Greenprint Objectives, York Region Food Network, and The Ministry of Agriculture and Food. The grade 7 and 8 students are excited for the arrival of shipping containers in the New Year. These grade levels are going to be participating in the urban farm mentoring program for the younger grade levels. One of the objectives of the school's curriculum is to develop leadership skills for their soon-to-be graduates. Anticipation has grown since the fall when the surrounding neighbourhood worked together collecting food waste. This has now become an annual event to clean up any crop waste from the end of harvest – becoming the annual Fall Harvest Festival. Neighbours and the Community Company Farmers will have food waste throughout the year for composting. Now it is close to the end of the school year, Friday June 7th, 2013, the grade 8 students are graduating and they have great memories of the Fall Harvest Festival, Halloween parties, and the school pumpkin patch, that they helped grow.

The summer before high school, some of students from Ashton Meadows Public School volunteer or are hired by York Region, to help the people living at Trinity Square start up their Allotment Farm. Many of the neighborhood farmers provide employment opportunities for school children



FOOD Hub
Perspective

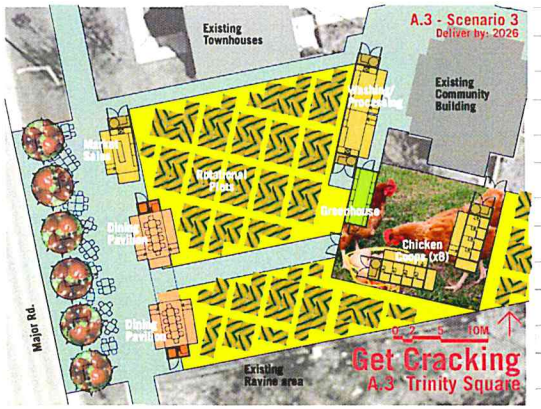




and low income individuals. The farmers teach them many skills, from growing your own food to time management, business etiquette, and other life skills. High school students help build new raised beds, maintaining weed control, and canvassing for tool donations from the surrounding neighbourhood. Washing stations, tool storage and composting areas are provided at the barn/ market modules for everyone to share. The modules, with existing residential downspouts, gather rainwater from the rooftops for collection and washing of crops.

Just like the allotment farm, the adjacent neighborhood farms and FOOD Hub farm are flourishing with activity on the weekends. Neighborhood farms act as neighborhood parks and the urban farms are destination parks.

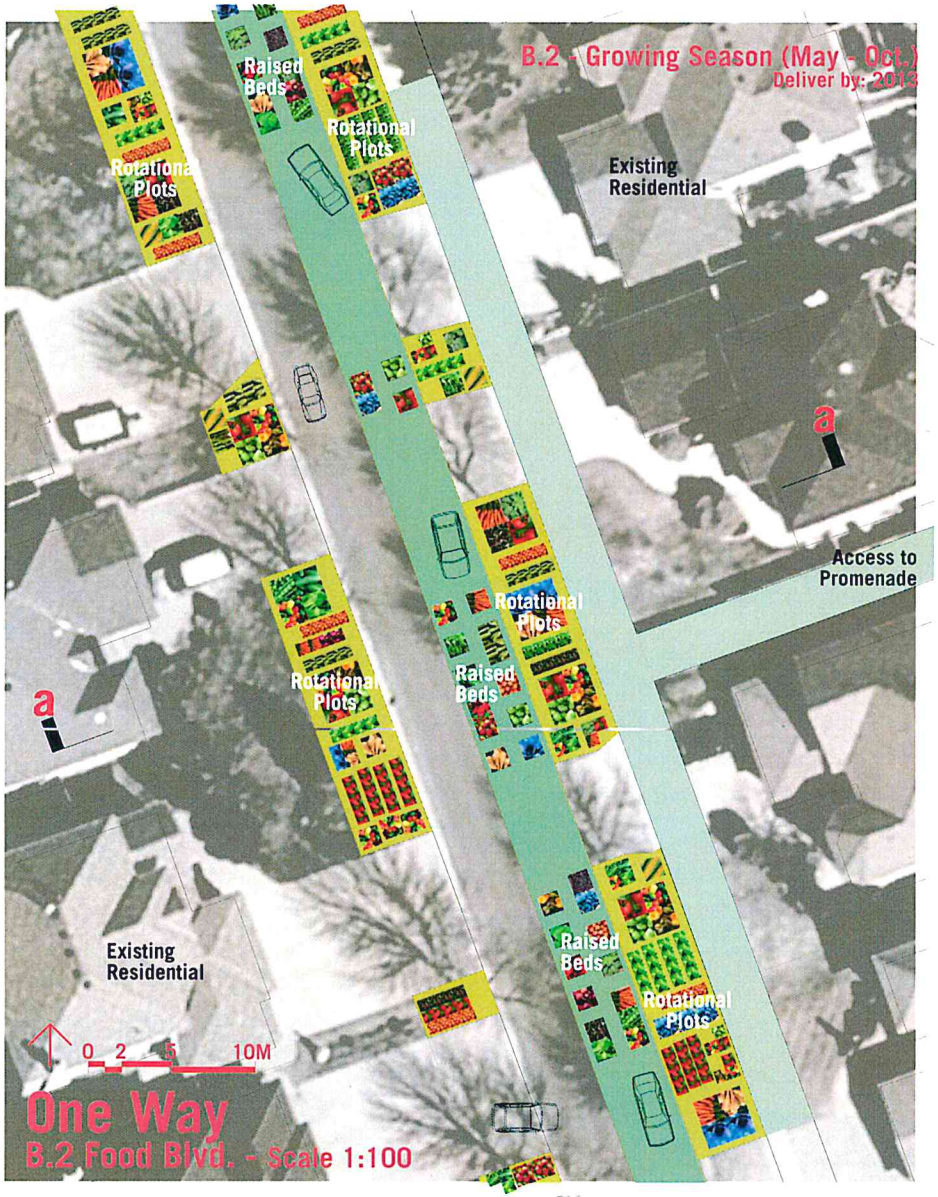
Throughout the four years of their high school education some of these students have developed their skills at the nearby Neighbourhood Farm and FOODHub by taking classes on Urban Farmer Training, Composting 101, Aquaculture and Food Preservation. Now the grease on the gears is building, and food preservation is becoming more popular and the Trinity Square Allotment Farm begins growing a variety of berries. The process of preserving will become an annual event for the community and this Public Housing property. Maybe there will be an Egg Farm one day at Trinity Square and the 100 Units on the property will not have to buy an egg from the grocery store ever again!

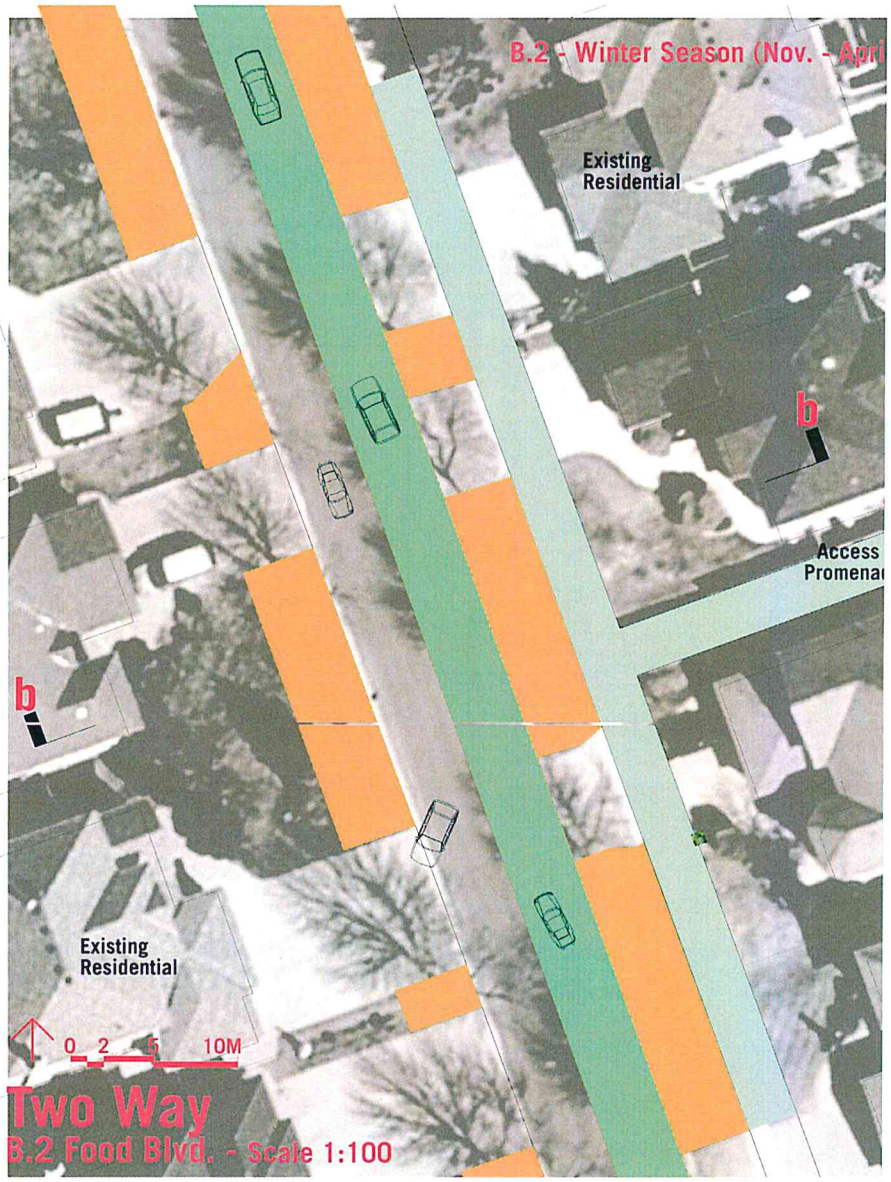


Egg Farm - Perspective

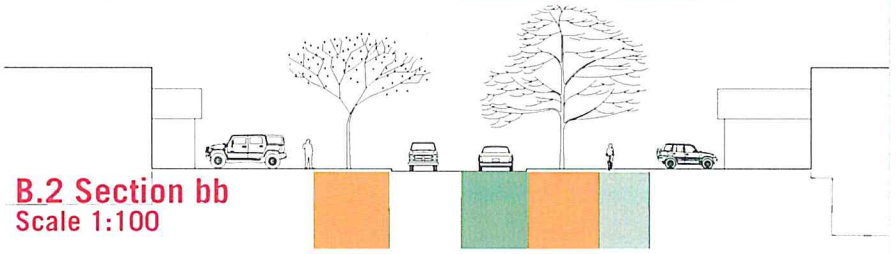
One of the farmed network links from the FOOD Hub to the Hydro Corridor Promenade is the Eyer Drive - Food Boulevard where community members who rent plots have organized themselves into a CSA. Today they are picking the weekly shares for members to pick up within a few hours of harvesting. - Within the food blvd. plots are divided so, they can choose how large of plot they would like to have and members share tools and use a barn/market module to wash all their produce and box it up in the CSA crates. Along the food boulevards neighbours start having block party events. Many of the streets have organized themselves to enjoy the fresh food and in some cases, trade or sell the products they are growing. The street converts from one way traffic in the growing season, to two way traffic in the winter.

There are many activities happening Friday, June 5th, 2020, at the Hydro Corridor - North Market, located at the intersection of Macrill Rd. and the hydro corridor promenade. The site for the market creates a raised crosswalk to slow down traffic and on either side of the crosswalk the road is narrower and is a permeable surface. The Hydro Corridor has been transformed over the years into a linear neighbourhood farm with a promenade running through the center of the easement. The promenade interconnects the local food district and is more active from the beginning of spring to the first snowfall of the year. Also, it is an example of a non-vehicular, safe route to other system nodes or other areas throughout the suburbs.





B.2 Section aa
Scale 1:100

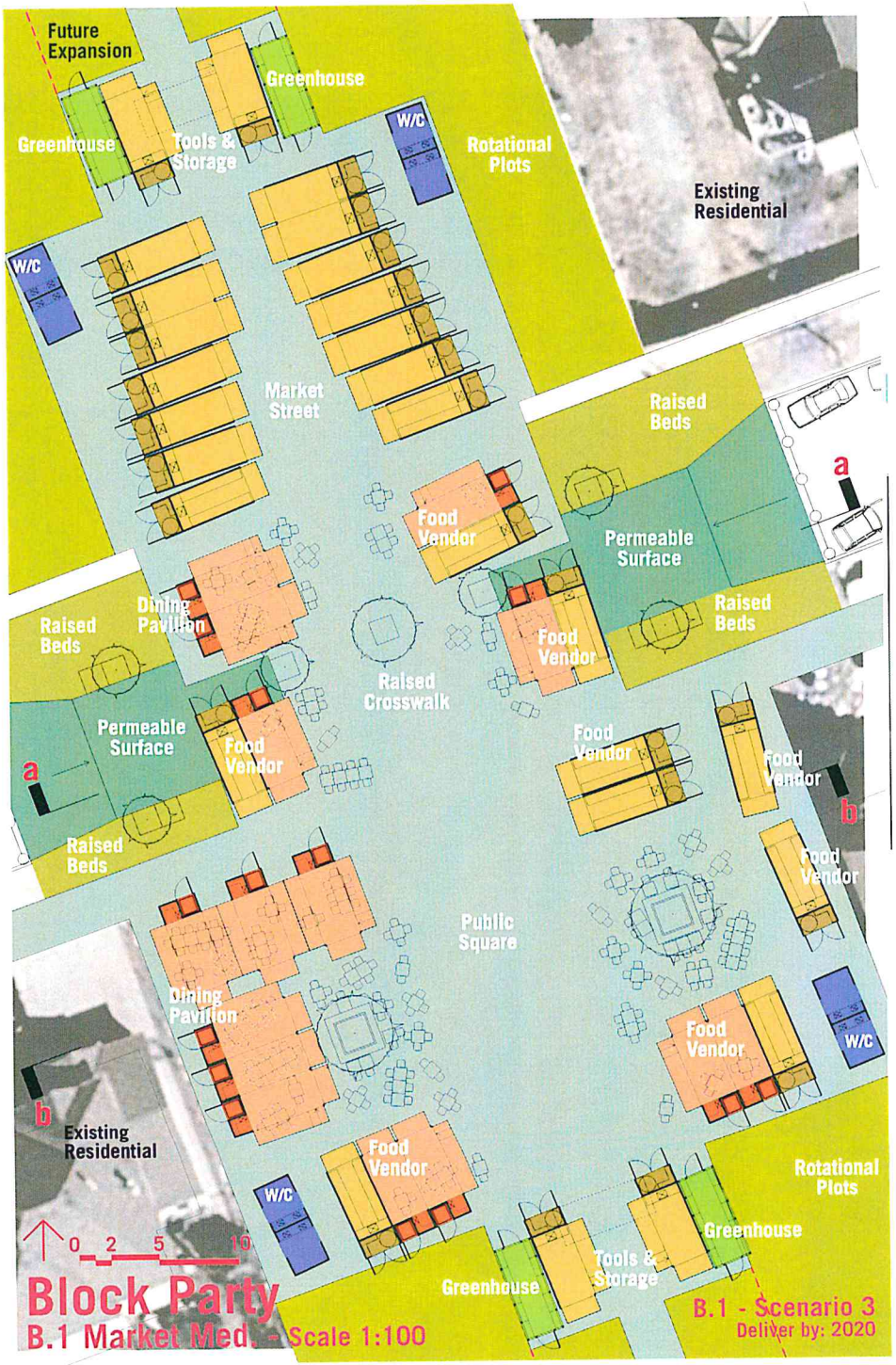


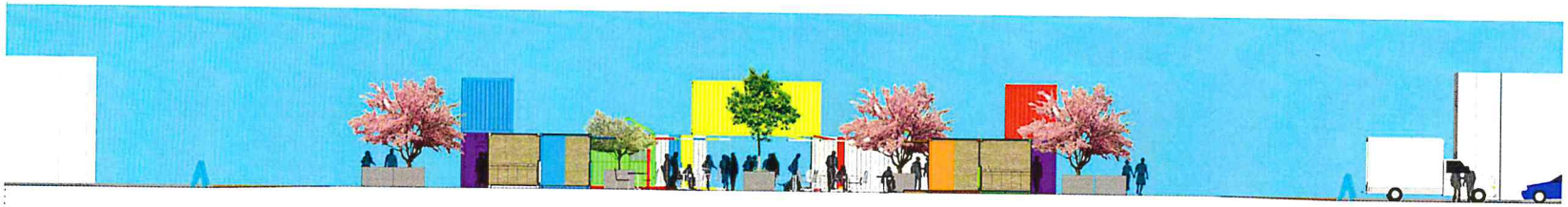
B.2 Section bb
Scale 1:100

Throughout the growing season the urban farmers are managing parcels half an acre or larger, utilizing the full width of the easement. Together with community members, they are growing fruits and vegetables for personal consumption and/or resale in the local food system at the nearby market nodes and modules. The farmers with their staff or volunteers, are washing the produce and then canning, drying or freezing items. As community members circulate from the linking food blvds. to the designated bike route, they can stop at the markets and purchase items directly from the urban farmer.

The weekends are always very busy along the Hydro Corridor Promenade and as part of the weekend events the market is busy with community members or regional farmers selling produce at the modules. Every Saturday when you visit the Market and Public Square in the morning, farmers and food vendors are opening their doors and setting up tables and chairs. You can smell sweet buttermilk pancakes and peppery sausage. The smells always seem much richer when the milk and sausage are grown and processed from the local food district. Today and for the remainder of weekend the road has been closed off by the Market and Public Square, transforming it into a civic space a-buzz with community members from morning to late in the evening. As a special event for the weekend and start of the summer growing season, Community Company has organized a movie showing. A big screen will be assembled on the stacked containers at the south end of the Public Square.

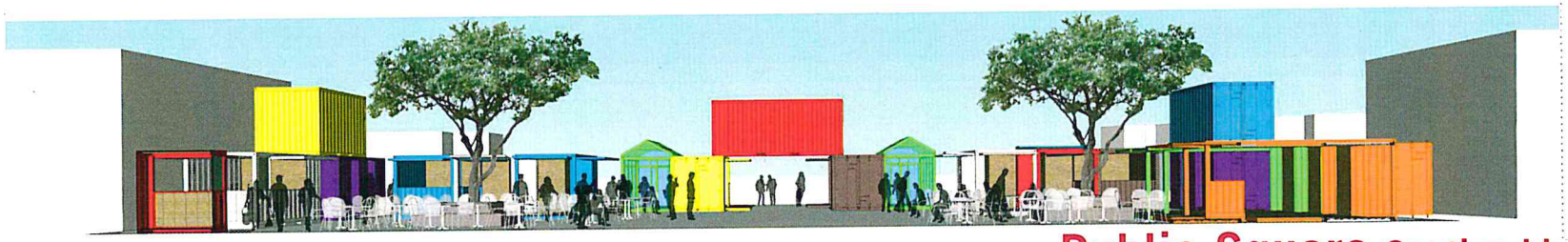
B.1 - Scenario 3
Aerial View





Market Street Section aa

Market
Perspective



Public Square Section bb

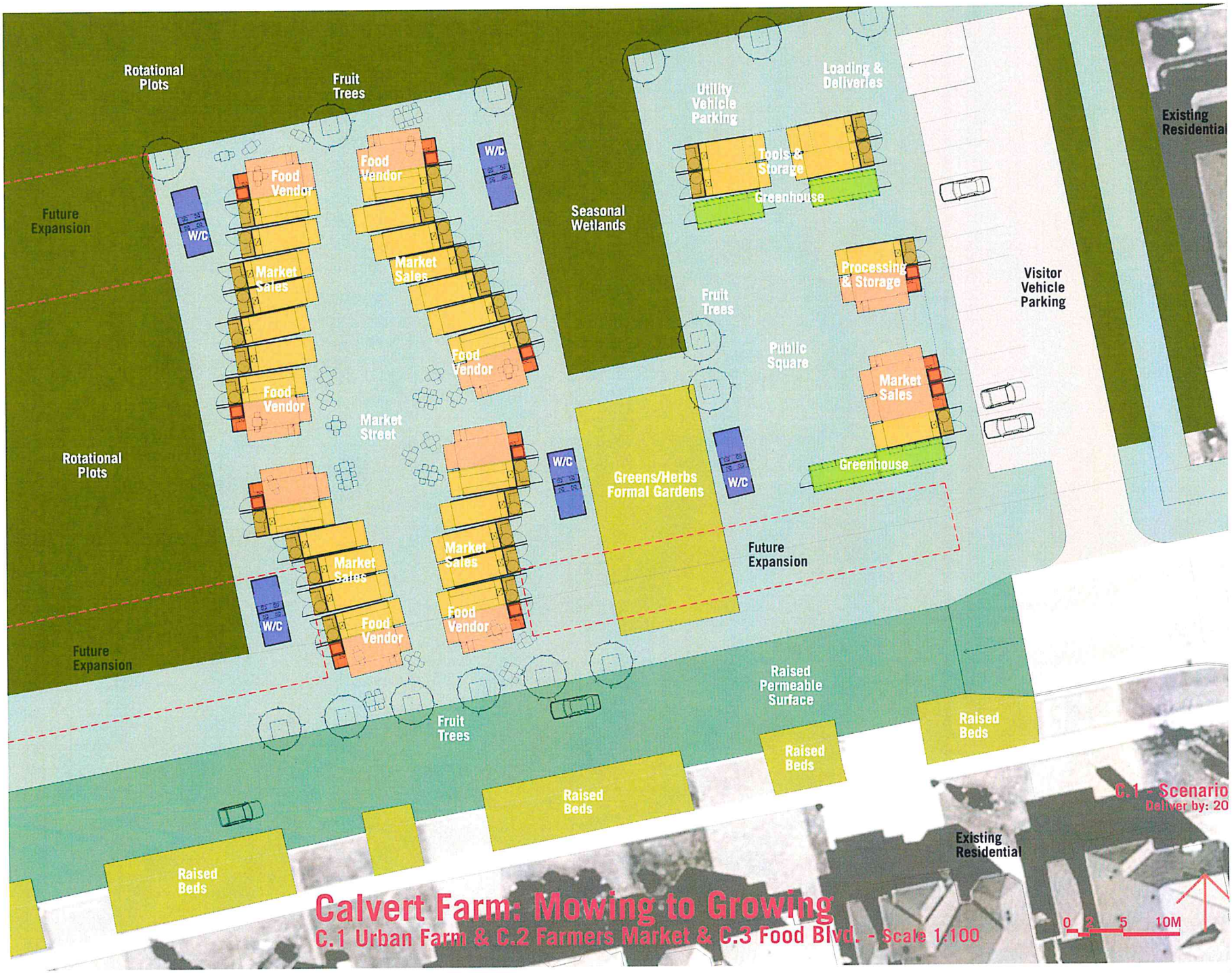
Movie Event
Perspective

Year after year, the most important aspect of the created civic space is how the community has come together around food.

The Calvert Urban Farm was initiated a year ago and sits next to Calvert Park with an existing baseball diamond and soccer pitch. This was a vacant property for some time and is still owned by the Public School Board. Most visitors are drawn to the urban farm to support the farmers at these locations. Those farmers are going to be the ones graduating from the flourishing Durham College – Food & Farming program!

The urban farm as part of the Fall Harvest Festival is offering special classes on such things as how to build a raised bed and transform it into cold frame boxes for season extension. Most of the community members go to one neighborhood farm or urban farm. As community members, a portion of their taxes support the farmers at these farms. Farmers give tours to the public and children are running up and down the rows of carrots, lettuce and cabbage. The tours allow community members to meet their farmers and create relationships. Since this urban farm is part of the Public School System, students from other schools in Markham have come here for field trips. The farmer here works with the teachers and students, who help plant and harvest throughout the year. As they head to the baseball diamond or soccer field for the end of season tournament, they show their parents and friends the farm they helped build.

This is a vision for a Local Food System in one of the many existing Greater Toronto Area suburban developments. This is a vision of an urban agriculture that is diverse in scale, location, and orientation, with multiple outcomes and possibilities of job creation, recreation, and social cohesion, all based on cost-efficient, low-input, high-output, organic production.


Rotational Plots
Fruit Trees
Utility Vehicle Parking
Loading & Deliveries
Existing Residential
Future Expansion
W/C
Food Vendor
Food Vendor
W/C
Seasonal Wetlands
Tools & Storage
Greenhouse
Market Sales
Market Sales
Processing & Storage
Visitor Vehicle Parking
Fruit Trees
Food Vendor
Public Square
Food Vendor
Market Sales
Market Street
Rotational Plots
W/C
Greens/Herbs Formal Gardens
W/C
Greenhouse
Future Expansion
Market Sales
Market Sales
W/C
Food Vendor
Food Vendor
Future Expansion
Raised Permeable Surface
Fruit Trees
Raised Beds
Raised Beds
Raised Beds
Existing Residential
Raised Beds
C.1 - Scenario
Deliver by: 20
Calvert Farm: Mowing to Growing
C.1 Urban Farm & C.2 Farmers Market & C.3 Food Blvd. - Scale 1:100
0 2 5 10M

4.3 CONCLUSION

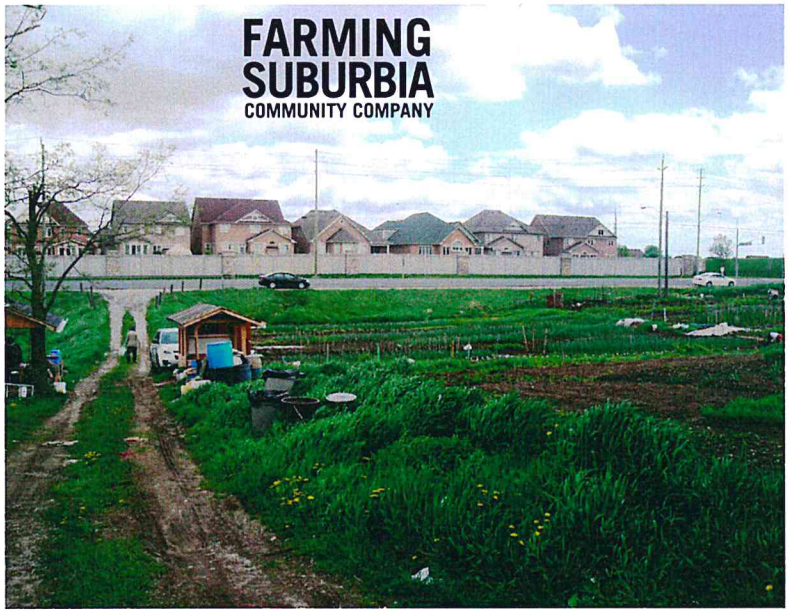
4.3 CONCLUSION

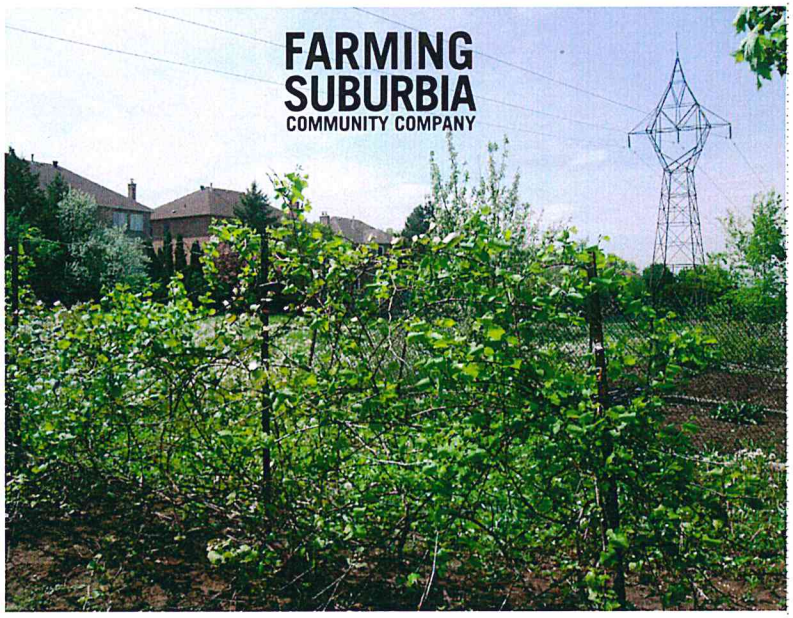
When reflecting upon this thesis, it may appear as a utopian vision, comparable to Howard's Garden City or Wright's Broadacres. Community Company is a proposal for developing an idealized communal network – a local food system within the existing environment known as the typical suburb. Through the lens of social cohesion, Community Company takes its form at the larger scale as networked food districts comprised of civic spaces, and at the smaller scale, community nodes utilizing food production, distribution and consumption as the great (re) connector. In reference to Broadacres; the design proposal is alike in that it could, theoretically, spread throughout suburban neighbourhoods and extend beyond the city, should the need arise.

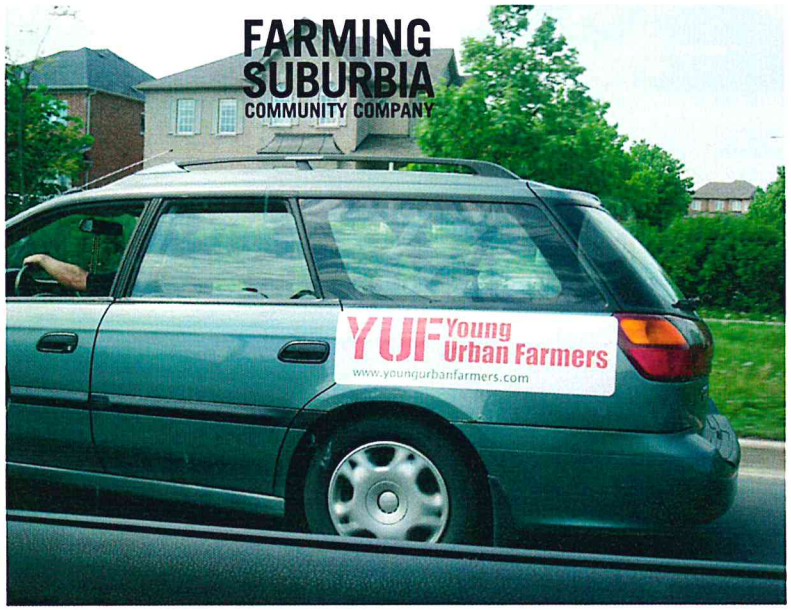
A cherry tree in someone's back yard, is not just a cherry tree. People or families will gather to enjoy the cherries together, similar to the word – Company. This This is a dualistic image (top left) of the problem statement and design proposal but, it is not just an allotment farm. People at this farm are enjoying an activity as they would in a recreational park. The hydro corridor image (top right) is an existing example of guerrilla gardening but, it is not just another garden. People inherently want to work together and share, this goes beyond "just another garden" in their own backyards. This signals an opportunity to place a graft or insertion into civic spaces using urban agriculture with inherent benefits of a more social, interactive culture.

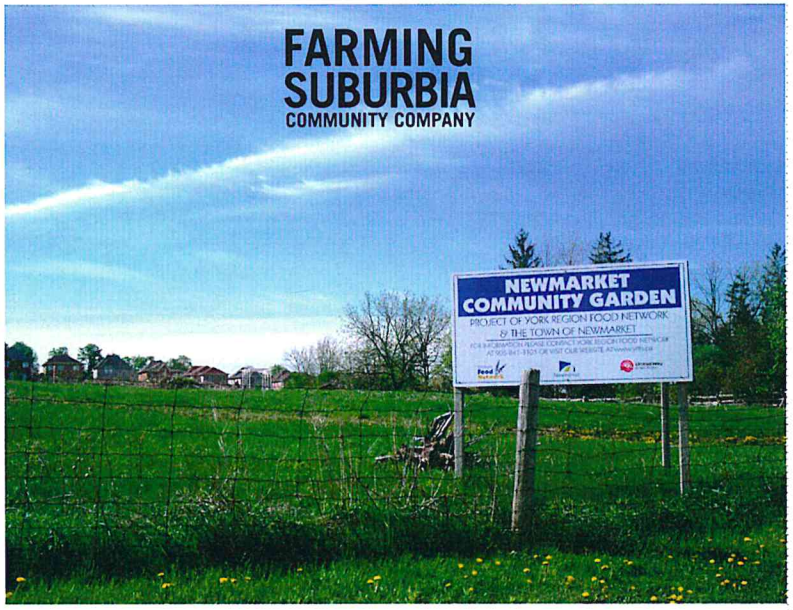
The signs are everywhere, even when I was driving — as in this signage at the community garden (bottom right). What architect wouldn't want to be involved in such a positive community project? A request for proposal from the municipality would read... *"Design a local food system that is the opposite of the current urbanization of a typical suburbs and, insert local food production as the fuel to ignite a greater sense of community - Food can be the great (re)connector."*

This thesis is an effort to respond to that design challenge.


FARMING
SUBURBIA
COMMUNITY COMPANY


FARMING
SUBURBIA
COMMUNITY COMPANY

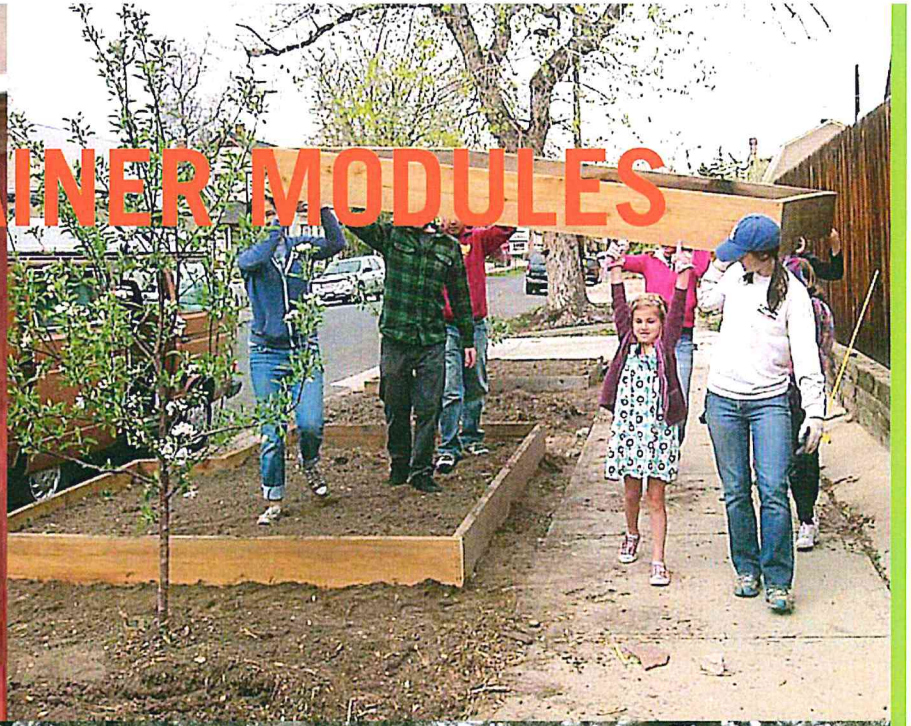

FARMING
SUBURBIA
COMMUNITY COMPANY
YUF Young Urban Farmers
www.youngurbanfarmers.com


FARMING
SUBURBIA
COMMUNITY COMPANY
NEWMARKET
COMMUNITY GARDEN
PROJECT OF YORK REGION FOOD NETWORK
& THE TOWN OF NEWMARKET

APPENDICES:

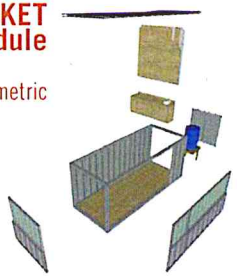
SHIPPING CONTAINER MODULES
YEAR -ROUND LOCAL HARVEST
THE SEASON EXTENSION TOOLS
WINTER FARMING CROP INDEX

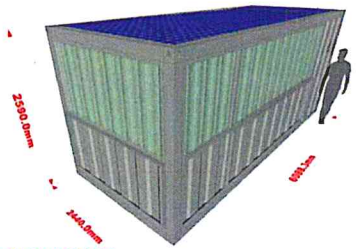
SHIPPING CONTAINER MODULES



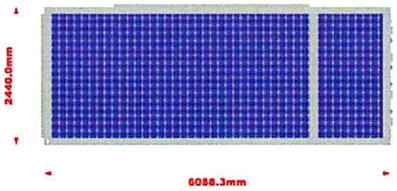
BARN/MARKET Module

Exploded Axonometric

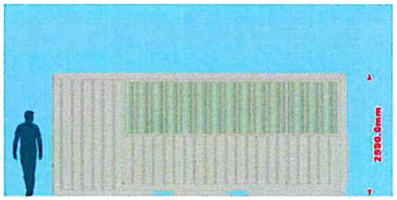




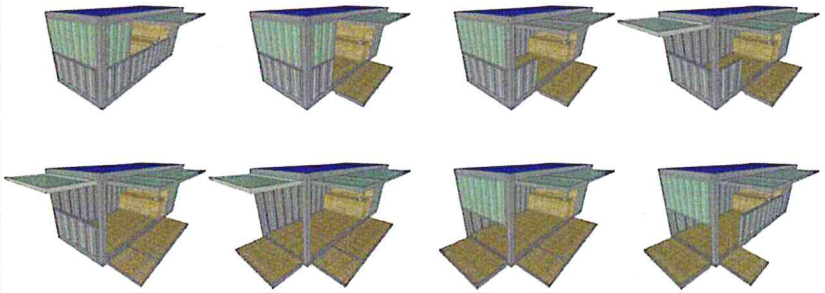
BARN/MARKET Module - Isometric

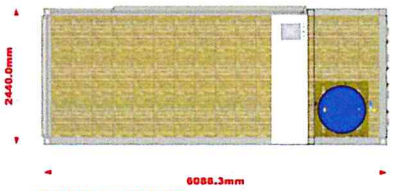


BARN/MARKET Module - Solar Panel (Roof) Plan

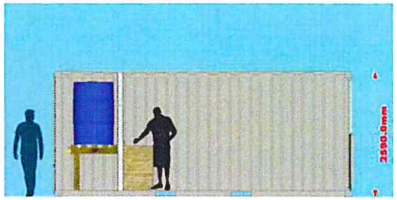


BARN/MARKET Module - Elevation

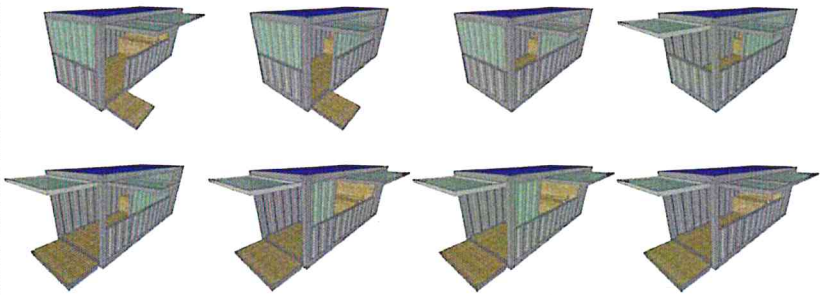


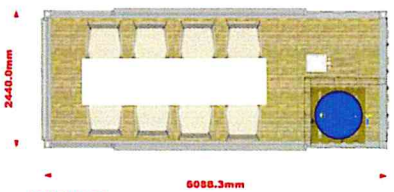


BARN/MARKET Module - Floor Plan

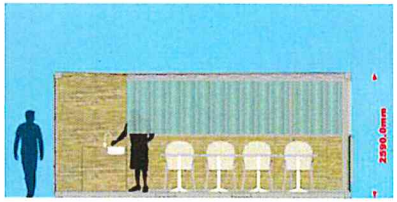


BARN/MARKET Module - Section





DINING Module - Floor Plan



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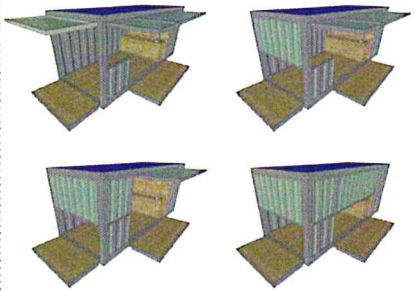

DINING Module

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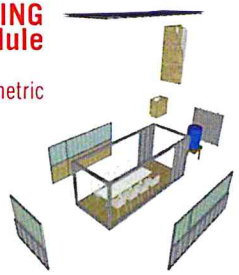

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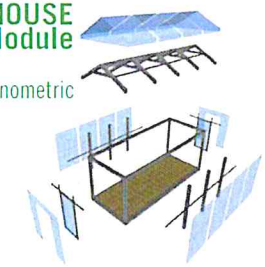

WASHROOM Module

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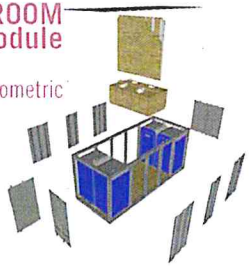


Today's burgeoning DIY— do-it-yourself — urban movement has been gathering steam over the past half decade. DIY projects tend to be small, temporary and portable. They occupy unused or underutilized terrain. They may reuse elements from older buildings or infrastructures or consumer products. Their instigators take in a wider cast of community players than the usual architects, builders and investors. Positioned as the architectural partner of the locavore food movement, especially given their stock-in-trade of culinary startups and food trucks, they feed off an international wave of pop-up, click-into sensibilities.

The startling turn of consumer society from industrial standardization to artisanal customization is finally being matched by a similarly nuanced and segmented approach to shaping urban space and form. Decades of opposition to top-down, large-scale planning efforts have led to a flowering of small, bottom-up, neighborhood-instigated DIYprojects: dumpster diving for grub and garb; guerilla land¬scaping on vacant lots and fences; linear parklets in place of barren concrete sidewalks or streets; flash-mob, smart-phone enabled gatherings of bicycles or food trucks; pop-up restaurants or busi¬nesses. Containers are part of this movement toward a practice of urban design that is flexible, respon¬sive and as electric as the currents that feed it. Containers function in a larger sense as seeds recycled from worldwide manufacturing and commerce, cellular catalysts that may be replanted anywhere to stimulate the growth of other agents of vitality in their vicinity. Their urban use resembles those scientific experiments in which containers are dropped off coastlines onto the ocean floor to create fractal surfaces to which coral can attach themselves and flourish.

Repurposing shipping containers has demanded a meaningful design transition from plans drawn on blank paper toward interventions positioned within dynamic systems — a move from the utopian to heterotopian, from a city conceived as a unitary, static ideal to one regarded as an aggregate work in progress whose dimensions are varied and not all apparent.

YEAR-ROUND LOCAL HARVEST

"Work the lazy garden. You pay rent for it all winter do you not? Make it earn dividends every month of the year.

– HENRY DREER

YEAR-ROUND LOCAL HARVEST

WOULDN'T IT BE GREAT TO HAVE YEAR-ROUND, FRESH, LOCALLY-GROWN, ORGANIC VEGETABLES?

In cold-weather climates like Canada's, this doesn't seem possible, at least, not without extremely expensive, energy-guzzling greenhouse operations. The surprising reality is, it can be done. With an energetically open-minded approach to farming, featuring plenty of research, planning and trial-and-error experimentation, it is possible to provide year-round organics, on a sustainable scale.

It begins with the regular outdoor growing season here in southern Ontario, lasting from May through September, when the days are long and the temperature warm. In the best of years, with an early last frost in spring and a late first frost in the fall, that's only five months of good growing weather. Many garden vegetables don't take well to cold but fortunately many others do. For example, hardier fare like cabbage, broccoli, cauliflower, and kale, spinach, swiss chard, and root crops like carrots, parsnips, beets, and potatoes, can easily last through the cooler, darker month of October. So that brings us six months of outdoor growing. After that, we have to dip into the farming toolbox to stretch the season.

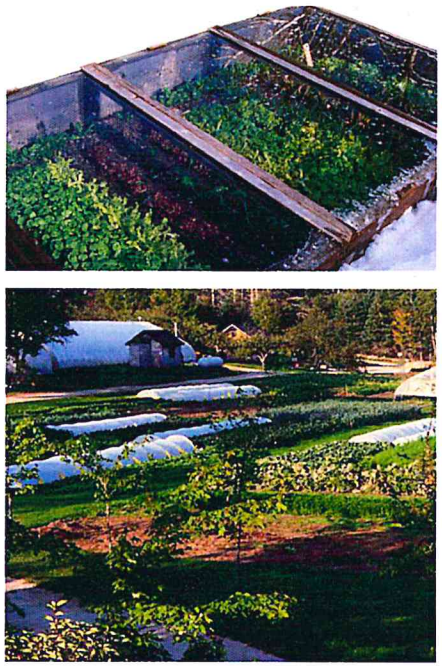


Figure 28 - 29: Cold frame boxes, cool greenhouse and low tunnels protect fall crops as winter approaches. The Winter Harvest Handbook, 2009

What's in our farming toolbox? To stretch the prime six months of the year right around the calendar, we have to combine several methods and techniques. Season extension refers to just about any approach to growing that somehow modifies the weather conditions at the beginning and end of the regular outdoor growing season to allow for longer production. The fully heated greenhouse is the ultimate season extender, but it also costs a fortune both to build and to provide heat and light. There are many other more practical techniques. Some of the most interesting for our purposes include transplants, row covers, mulch, and unheated greenhouses. By combining various techniques with creative crop selection and timing, we can fairly easily add a month to the beginning and a month to the end of the outdoor season, April and November. Our total is now eight months. The season extension tools are explained further in the next part of this chapter.

Then there's winter harvest, a more extreme technique that can fill out the coldest months with absolutely fresh veggies. Certain hardy crops, including carrots, spinach, and a number of other greens, can be grown in late summer and fall, left in the ground in unheated greenhouses, and harvested through winter, into March and even April. Even with low-light days of winter, they don't really grow much, but remain healthy and fresh. All of that covers the remaining four months, allowing us to grow for a full twelve months, right through the calendar. Of course, there's a difference between what's growing and what's available to eat. For consumption right around the the calendar, a couple more approaches need to utilized.

Winter storage, as in root cellars and preserving, is the traditional agricultural method to have local veggies during the winter months, right until the very first new harvests begin in May and June. Given the proper cool conditions, a whole range of crops can be stored fresh for several weeks to several months, things like cabbage, potatoes, carrots, onions, squash, even tomatoes. Crop planning plays a big part here as well. Certain varieties are especially good for long-term storage. Preserving food by a variety of methods, including pickling, canning and freezing, accommodates an even wider veggie selection. A seasonal diet is the final strategy. It's not exactly an agricultural technique but it is cultural shift that can be beneficial to a year-round, sustainable, local food equation. By adjusting our ideals towards a fresh and locally grown food culture for the seasons of the year, our expectations could be modified to match the harvest making year-round, locally-grown agriculture a possibility.

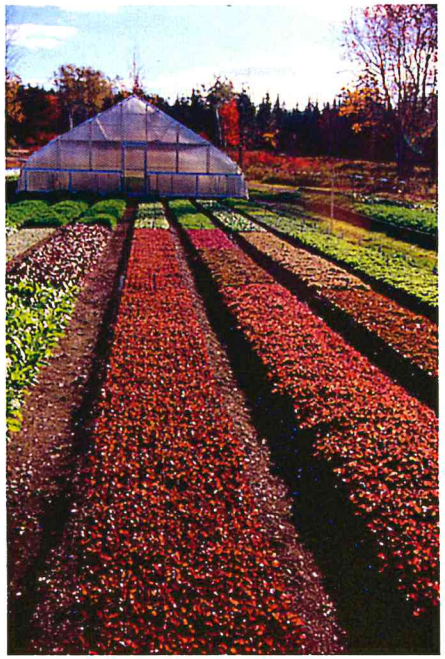
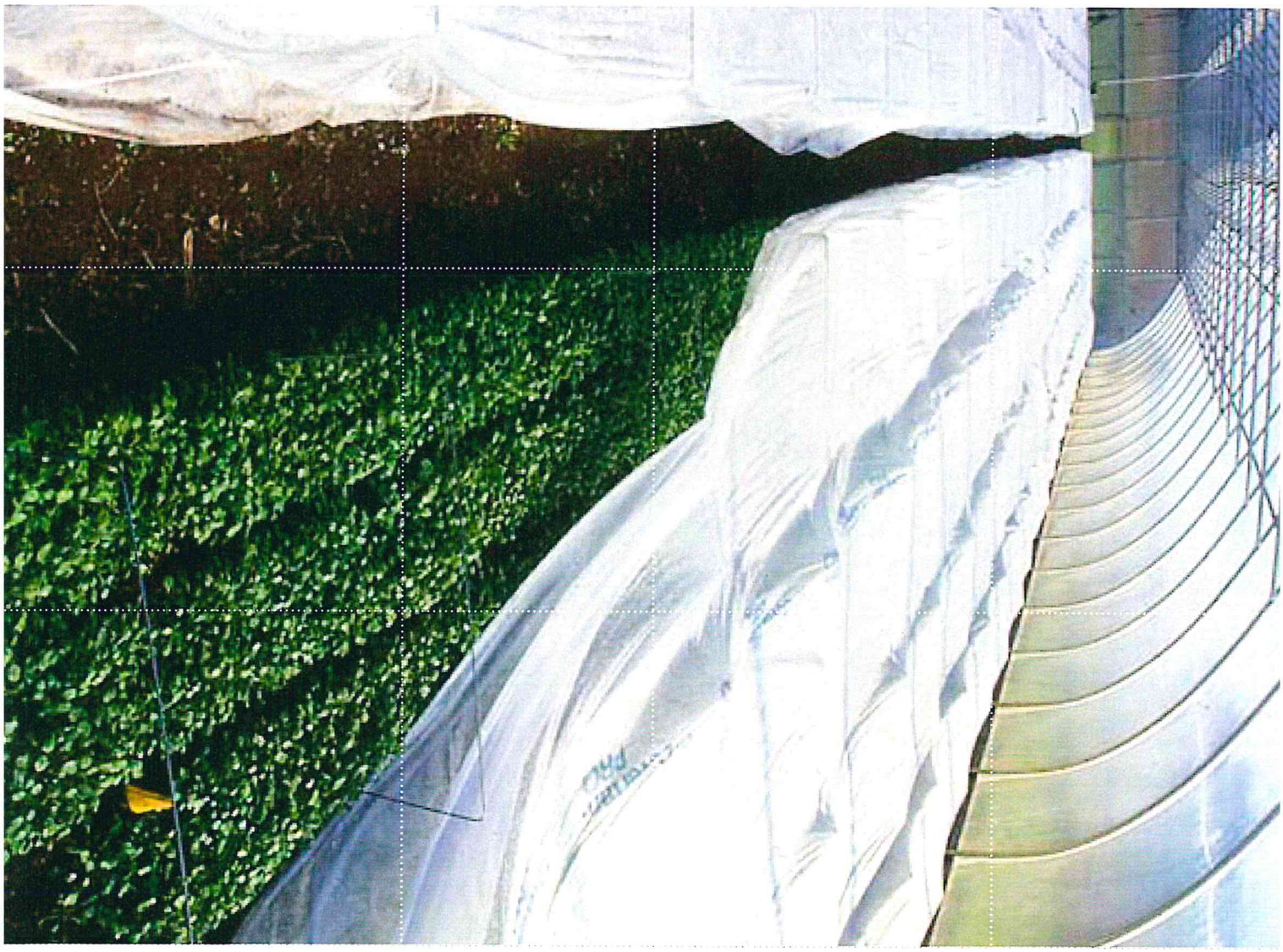


Figure 30 (left) & Figure 31 (right): lightweight floating row cover that allows light, air and moisture to pass through. The Winter Harvest Handbook, 2009.



THE SEASON EXTENSION TOOLS

" . . . to make a real difference in creating a local food system, local growers need to be able to continue supplying "fresh" food through the winter months... [and] to do that without markedly increasing our expenses or our consumption of non-renewable resources." – ELIOT COLEMAN

SOURCE: http://www.istockphoto.com/ 000008974723

THE SEASON EXTENSION TOOLS

IN AGRICULTURE, SEASON EXTENSION REFERS TO ANYTHING THAT ALLOWS A CROP TO BE CULTIVATED OR HARVESTED OUTSIDE ITS NORMAL PRODUCTION SEASON.

Farmers can extend the production and harvest season for crops through techniques that are based on thermal principles and techniques that evolve from two primary strategic goals:

- Protecting crops from damage from extremes of heat or cold.
- Enhancing the growth of crops for quicker maturity and higher quality under adverse weather conditions.

Often one technique will affect more than one strategy. For example, a raised bed will dry faster and warm up sooner in spring, but will therefore require more attention to irrigation needs, and may develop higher-than-desirable soil temperatures when summer arrives. It can also cool faster than flat ground. Another example: A row cover may protect a crop from a frost, but can also prevent the crop from developing as much hardiness as an uncovered crop, due to the artificial mild climate under the cover. Season extension techniques vary greatly in their level of complexity. They can be as simple as selecting an early maturing, cold-hardy or heat-tolerant variety; planting a wind break;

or irrigating crops to reduce crop damage from heat or cold. They can be as complex as year-round production in a heated greenhouse.

Farmers through the centuries have learned to use available materials to produce earlier crops in the spring, grow cool-season crops in summer, maintain production well into the fall, and even harvest crops through the winter. Time-honored methods include cold frames heated with manure, shade structures, windbreaks, irrigation, masonry walls or stone mulch as heat sinks, and cloches (glass bell jars) to protect individual plants.

The use of plastic in horticultural has increased dramatically in the past decade, greatly extending the possibilities for year-round production. Variously colored plastic film mulches, row covers, shade cloths, low tunnels, and high tunnels/hoophouses help to protect crops from the weather. High tunnels are springing up around the country as market gardeners increasingly view them as essential to their operations.

CULTURAL PRACTICES FOR MODIFYING MICRO-CLIMATE

Almost all plants benefit from increased early and late-season warmth. Many cultural techniques can modify the microclimate in which a crop is grown, without using structures or covers, though some of these techniques require long-term planning.

SITE SELECTION

Land with a south-facing slope will stay warmer in the late fall and warm up sooner in the early spring. In areas of relatively low elevation, a higher-elevation site only a few miles away can easily have a 4 to 6-week longer growing season. A site on the brow of a hill, with unimpeded air drainage down the hill, would be ideal for maximizing season extension.

SOIL AND MOISTURE MANAGEMENT

Adding organic matter, tillage, and raised beds improve drainage. Soils can affect temperature because their heat storage capacity and conductivity vary depending partly on soil texture. Generally, when they are dry, sandy and peat soils do not store or conduct heat as readily as loam and clay soils. The result is that there is a greater daily temperature range at the surface for light soils than for heavier soils, and the minimum surface temperature is lower. Darker soils often absorb more sunlight than light-colored soils and store more heat.

CULTIVAR SELECTION

Cultivar selection is important for early crop production. The number of days from planting to maturity varies from cultivar to cultivar, and some cultivars germinate better in cool soil than others. Staggered planting dates can be combined with the use of cultivars spanning a range of maturity dates to greatly extend the harvest season for any one crop.

TRANSPLANTING

Use of transplants (versus direct seeding) is another key season-extension technique. Some crops have traditionally been transplanted, and recent improvements in techniques have expanded the range of crops suited to transplant culture. Transplants provide earlier harvests by being planted in a greenhouse several weeks before it is safe to direct-seed the same crop outdoors. If a grower uses succession planting or multiple cropping (i.e., follows one crop with another in the same spot), transplants provide extra time for maturing successive crops. Transplants hit the ground running, with a 3 to 4 week head start on the season.

IRRIGATION

Increasing or decreasing soil water content can enable tillage operations, prevent water logging of the root zone and/or aid germination. Overhead sprinklers, furrow, and drip irrigation can be used to protect crops from frost. Sprinklers are turned on when the temperature hits 33°F. When the water comes in contact with plants, it begins to freeze and release heat.

WINDBREAKS

The major benefit of a windbreak is improved use of moisture. Reducing the wind speed reaching the crop reduces both the direct evaporation from the soil and the moisture transpired from the crop. This moisture advantage also improves conditions for seed germination. Seeds germinate more rapidly and young plants put down roots more quickly. Improved moisture conditions continue to enhance crop growth and development throughout the growing season.

SEASON EXTENSION TECHNIQUES

Selection of varieties that mature over a range of dates allows a farmer to harvest a crop over an extended period. Heat tolerant varieties can be grown during warm months and cold tolerant varieties during cold months, to stretch out the proportion of the year in which a crop can be marketed. Salad greens and Cole crops can be successfully grown most of the year in many regions of North America if appropriate varieties are selected, particularly if combined with other season extension strategies such as shade cloth and high tunnels. Conducting on-farm variety trials is a good way to identify varieties that perform well in a particular region and when grown under a farm's unique suite of practices.

GROUND SURFACE AND FABRICS TOOLBOX

- Raised Beds are planting beds in which the soil has been loosened and piled up to a level above that of the surrounding soil surface. Raised beds heat up more quickly in spring, allowing earlier planting.

- Mulches are any material placed on the soil around plants. Plastic mulches are typically plastic sheeting with slits through which plants grow. These are used extensively in large-scale vegetable production to suppress weed growth, retain soil moisture, increase soil temperatures, and speed crop growth. Plastic mulches are permitted in organic production systems as long as the plastic is removed from the field at the end of the season. Biodegradable mulches are also used and made with starches from plants such as corn, wheat, and potatoes. They are broken down by microbes. They are currently more expensive than plastics mulches, but the lower price of plastics does not reflect their true environmental cost. Organic mulches are typically applied to retain soil moisture, increase soil organic matter content, and cool soils.

- Row Covers are light, porous, permeable fabrics placed over plants in order to retain heat. They can offer up to several degrees of frost protection, as well as protection from wind and insect pests. Two main types of row covers are:
  1. Floating row covers - lie directly over the crop and may cover multiple rows.
  2. Hoop-supported row covers - sometimes referred to as low tunnels, they generally cover a single row

STRUCTURES TOOLBOX

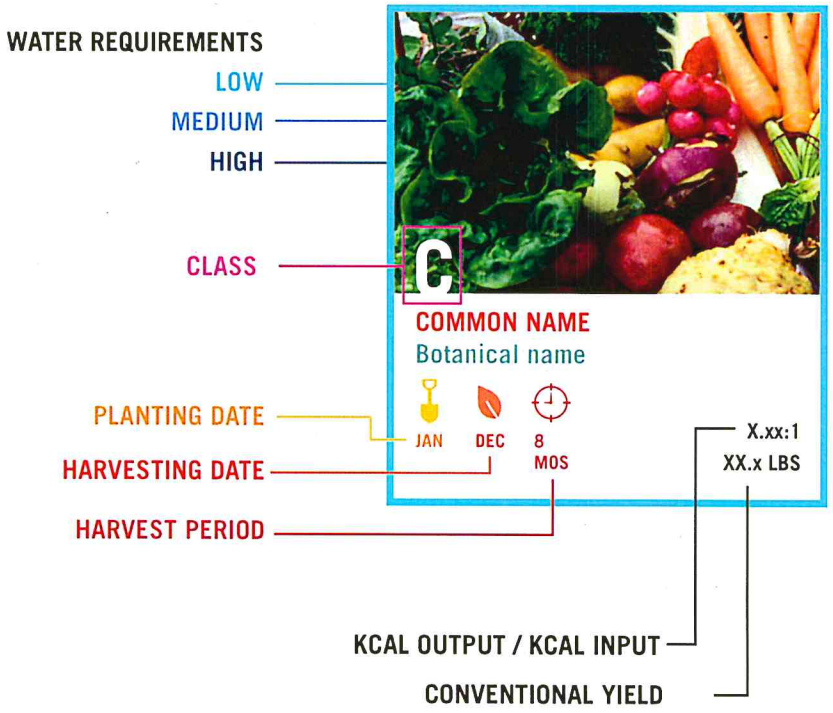
- Cold Frames are transparent-roofed enclosures, built low to the ground, used to protect plants from cold weather. Cold frames are more typically found in home gardens and on smaller vegetable farms. They are most often used for growing seedlings that are later transplanted into the field. field.

- High Tunnels are metal frames covered in plastic sheeting. They function similarly to greenhouses, but are generally unheated and in most cases do not have exhaust fans. Many high tunnels are constructed so they can be moved from one location to another, to permit crop rotation and soil management.

- Greenhouses, the fully heated and artificially lit greenhouse is the ultimate season extension device, as it allows crops to be grown year-round, even through sub-zero winters. However, the adoption of this energy-intensive form of season extension by organic farmers has been debated in organic and sustainable agriculture communities. communities.

For clarification of the structures noted above, they are sometimes identified as Cold and Cool Greenhouses referring to specific low temperatures. A cold greenhouse has a minimum temperature of 32°F and a cool greenhouse has a minimum temperature of 45°F. For the purpose of my thesis these terms: cold greenhouse describes a greenhouse that is unheated and cool greenhouse describes a greenhouse that is maintained at a minimum temperature just above freezing. Overall, the terms greenhouse and high tunnel will be used interchangeably to refer to the pipe-frame, plastic-covered, translucent structures in which the vegetables are grown.

WINTER FARMING CROP INDEX



CLASS NOTIFICATIONS

C	COLE/CABBAGE
F	FLESHLY-FRUITED
G	GREENS
Gr	GRAIN
O	ONION GROUP
P	PERENNIALS
S	SALAD
V	VINE
L	LEGUMES
T	TREE
R	ROOT
M	MISCELLANEOUS

P

ARTICHOKE, GLOBE

Cynara Scolymus

OCT JAN 4 MOS

P

ASPARAGUS

Asparagus Officinalis

OCT DEC 3 MOS

ND
7.3 LBS

F

AUBERGINE

Solanum melongena

OCT APR 7 MOS

ND
55.1 LBS

L

BEANS, BUSH

Phaseolus spp

OCT JAN 4 MOS

0.345:1
17.6 LBS

C

BROCCOLI

Brassica oleracea

OCT JAN 4 MOS

0.33:1
33.9 LBS

C

OCT JAN 4 MOS

0.69:1
36.7 LBS

C

CABBAGE
Brassica spp

SEP | MAR | 7 MOS

0.76:1
69.4 LBS

R

CARROTS
Daucus carota

? | FEB | ?

ND
72.5 LBS

C

CAULIFLOWER
Brassica botrytis

SEP | JAN | 5 MOS

ND
38.5 LBS

S

CELERY
Apium graveolens

OCT | DEC | 3 MOS

0.599:1
160.7 LBS

G

CHARD, SWISS
Beta vulgaris

OCT | APR | 7 MOS

ND
34 LBS

V

CUCUMBER
Cucumis sativus

OCT | DEC | 3 MOS

0.35:1
39.3 LBS

GARLIC
Allium sativum

SEP — MAR — 7 MOS

ND
40.9 LBS

KALE
Brassica sabellica

OCT — MAY — 8 MOS

ND
16 LBS

KOHLRABI
Brassica caulorapa

OCT — MAR — 6 MOS

LEEK
Allium porrum

SEP — MAR — 8 MOS

LETTUCE, HEAD
Lactuca sativa

SEP — MAY — 8 MOS

0.14:1
85.8 LBS

ONION
Allium spp

OCT — APR — 7 MOS

ND
101.4 LBS

G

PARSLEY
Petroselinum crispum

OCT MAY 7 MOS

R

PARSNIP
Pastinaca sativa

OCT APR 7 MOS

L

PEAS
Pisum sativum

OCT DEC 3 MOS

1.7:1
9.2 LBS

F

PEPPERS, SWEET
Capsicum annum

OCT JAN 4 MOS

0.14:1
68.7 LBS

R

POTATO
Solanum tuberosum

SEP DEC 4 MOS

1.23:1
84.2 LBS

R

RADISH
Raphanus sativus

SEP MAY 9 MOS

RUTABAGA/TURNIP
Brassica napus

OCT MAY 8 MOS

ND
47 LBS

SPINACH
Spinacea oleracea

OCT MAY 8 MOS

0.23:1
34.6 LBS

SQUASH
Cucurbita pepo

OCT JAN 4 MOS

ND
27 LBS

TOMATO
Lycopersicon esculentum

SEP JAN 5 MOS

0.60:1
67 LBS

WATERCRESS
Nasturtium officinale

OCT MAY 8 MOS

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