

# Southeast False Creek

# Urban Agriculture Strategy

Prepared for

**City of Vancouver**

By

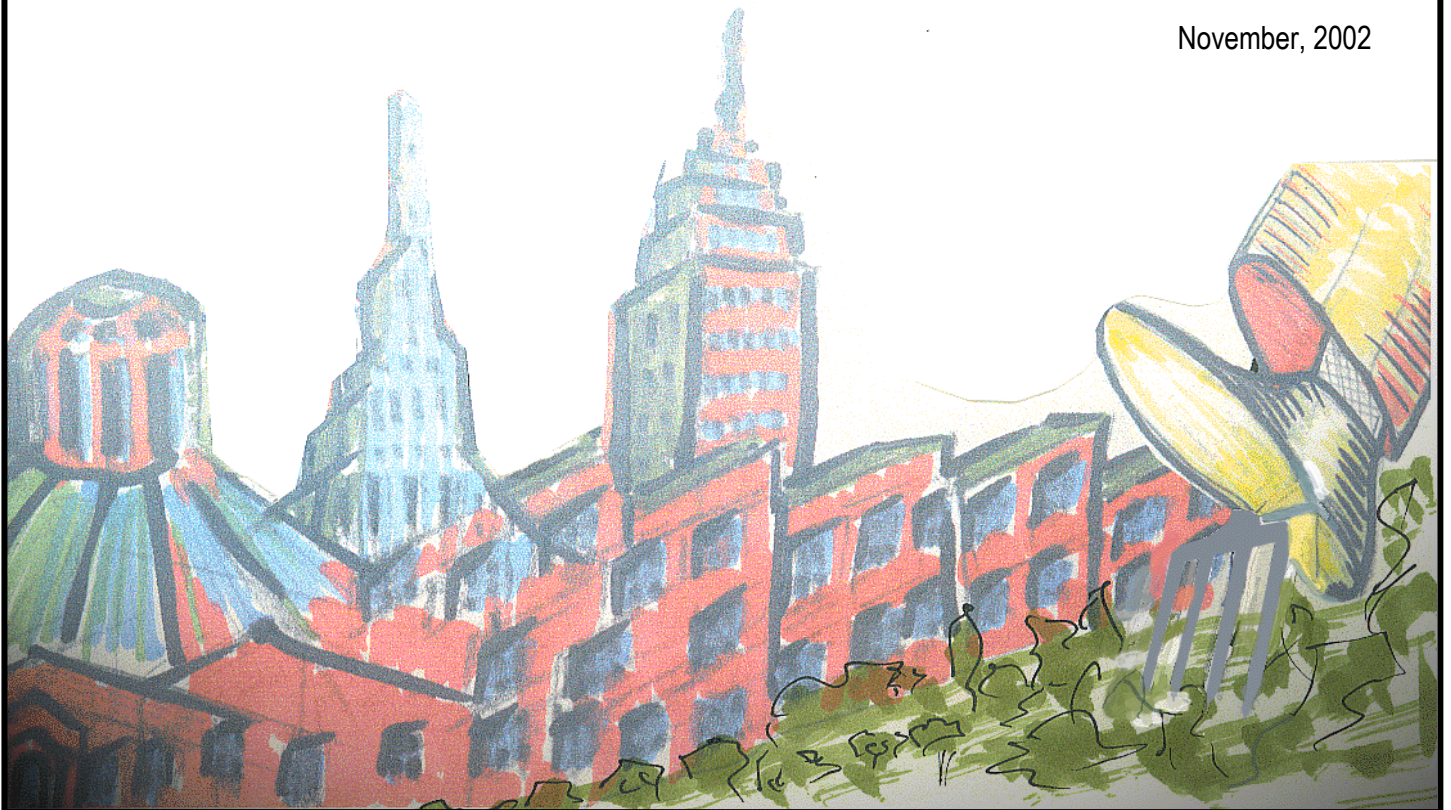
***Holland Barrs Planning Group***

In association with

***Lees + Associates***

***Sustainability Ventures Group***

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## **Disclaimer**

This study was commissioned by the City of Vancouver for the purposes of informing the planning process for the new community at Southeast False Creek. At the time of printing the recommendations offered in the report have not been adopted, and may not be adopted, as City policy. The opinions contained herein represent the opinions of the authors and do not necessarily reflect the views of the City of Vancouver.

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## Executive Summary

Planning for “sustainability” and “sustainable development” eventually come down to dealing with the fundamentals of life - water, air, energy, transportation and waste. Another, equally important dimension that is often overlooked by urban planners, but is nevertheless equally fundamental to our lives, is food and the agricultural systems that produce it. Most of us take our food for granted - so much so that we often forget the role it plays in our social relationships, community building and the role that food and agriculture have in shaping our economy and environment.

During the early planning stages of the proposed model sustainable community at Southeast False Creek (SEFC) in Vancouver, planners questioned the relationship between food, agriculture and sustainable urban development and began to consider the role of urban agriculture in such a community. The SEFC Urban Agriculture study attempts to answer these questions and incorporate the answers into a strategy that will assist with the planning of SEFC.

While the study of urban agriculture has gained considerable momentum in North America and elsewhere, and even become fashionable in recent years, this study may be the first of its kind in North America to focus solely on the role that food-related activity and urban agriculture could play in the comprehensive planning of a new neighbourhood.

The study team have chosen to define urban agriculture broadly to include not only food production activities within an urban area, but also food processing and distribution opportunities. This is the food system approach, which considers all elements related to food activity and the relationship between these elements.

### Fundamental Goals

SEFC is planned to be a model of energy efficiency and sustainable urban development and, as such, an urban agriculture strategy, should assist with achieving the fundamental goals of a sustainable community. Simply stated these are to:

- Reduce energy and material consumption and the production of wastes;
- Preserve the viability of ecosystems and halt the loss of biodiversity;
- Ensure economic viability and vitality;
- Strengthen social networks and enhance the quality of life for all in the neighbourhood.

SEFC has a fifth fundamental goal, which is to be a “model” for future urban developments.

It is within the context of these fundamental goals that the urban agriculture strategy for SEFC has been developed.

The report explores urban agriculture in the context of our current food system, and discusses some basic considerations for developing a strategy suitable for the model South East False Creek community. This includes examination of nine strategic objectives that will help achieve the fundamental goals. For each objective a number of strategic actions and policy directions are presented. These broad strategic

directions are followed by an examination of a number of specific food production, food processing and food distribution options that could support each objective at SEFC.

The report provides recommendations for implementing the options at each stage in the planning and development process.

### **Strategic Objectives, Actions and Policy Directions**

Nine objectives form the core of the strategy and a number of strategic actions and policy directions are associated with each:

#### **Objective #1 - Increase the physical capacity of the SEFC neighbourhood to support the growing of food:**

- Create *public community gardens* in the Parks, public open space (including some boulevards in street rights-of-way) and school grounds in SEFC;
- Design private (backyard) and semi-private (strata) gardens at grade for maximum solar access and ensure soil is free from contamination and of a high quality for agriculture;
- Develop the *podiums and rooftops* of buildings (especially concrete buildings) in such a way as to support greenhouses and/or rooftop gardens capable of supporting the growing of food;
- Provide *balconies* for as many units as possible, especially on the east, south and west face of buildings; and
- Create food gardens for students and the surrounding community on *school grounds*;
- Provide regulatory support and program *internal areas of some buildings* to support a range of appropriate food production facilities, including: agricultural technology or facilities, aquaculture systems and biaponics;

#### **Objective #2 - Increase the amount of food grown in SEFC, privately and commercially:**

- Establish accountable local organizations to manage public community gardens to ensure they are developed and maintained in a fashion appropriate to a highly used public space;
- Work with school administrators to encourage the development and use of gardens on school grounds and the integration of these spaces into the educational activities in the school;
- Provide information and support to strata councils and other building groups or companies to encourage the growing of food in private (or semi-private) gardens, balconies, rooftop gardens or greenhouses;
- Support the establishment of small companies or other organizations that can effectively and appropriately use interior spaces of buildings, parkades or rooftops to grow food for profit through a variety of means, including aquaculture, biaponics or through other agricultural technology (some of these techniques should begin as demonstration projects and if found to be successful expanded to other areas/buildings);
- Develop information resources and guidelines for the Parks Board, City staff and building owners and managers to use when designing or managing landscape areas to support the use of edible landscaping principles;
- Use edible landscaping strategies when selecting plants for the landscape plans of development parcels, parks and open space areas.

- Develop management policies for Farmers Markets located in SEFC to encourage the identification for shoppers what food for sale has been grown in SEFC;
- Consider encouraging commercial food processing facilities or restaurants in SEFC to grow or purchase food, herbs or other agricultural products grown in SEFC;
- Encourage companies in SEFC to establish eco-industrial network (EIN) relationships and look for opportunities to use food production to address the supply of materials or management of waste flows (i.e. compost organic wastes from one company and use the resulting soil to grow flowers for the tables of a nearby restaurant);
- Encourage local grocery stores to consider selling locally grown produce.

**Objective #3 - Increase the amount of food consumed in SEFC that is produced both organically and as close to SEFC as possible:**

- Promote the benefits of locally produced organic food, possibly undertaken in conjunction with the Vancouver Richmond Health Board or other agencies;
- Encourage school curricula writers to explore issues surrounding production of locally produced organic food; and
- Provide information to SEFC residents and businesses on the benefits and best management practices for growing organic produce.

**Objective #4 - Increase food-related economic development initiatives, including increasing the local processing of food consumed in SEFC:**

- Plan, zone and design buildings in the area for commercial food related activities (grocery stores, aquaculture, bioponics, food processing facilities, incubator or educational facilities, and emergency food service infrastructure); and
- Provide incentives to encourage small food processing companies to locate in SEFC where appropriate.

**Objective # 5 - Increase the capacity of SEFC to provide or support basic food security initiatives for local Vancouver residents in need:**

- Provide subsidized space and training for low income residents in SEFC's public community gardens;
- Encourage donations of some food produced in at SEFC to Food Banks or other organizations and/or to emergency food relief;
- Encourage the use of *edible landscaping* principles in all public areas.

**Objective # 6 - Encourage urban agriculture practices as a strategic approach to managing waste flows in a more sustainable manner:**

- Utilize urban agriculture practices as a strategic approach to managing waste flows;
- Provide information and assistance to groups overseeing the management of public community gardens or school gardens regarding composting of landscape litter and other organic wastes and their re-use in the garden areas;
- Promote the composting facilities in private backyards, rooftop gardens or greenhouses;
- Utilize heat pumps to move excess heat from interior spaces of buildings to greenhouses, where this approach is cost-effective;
- Develop aquaculture and/or bioponic facilities to utilize organic waste flows from the neighbourhood as food or nutrient streams for economic gains; and

- Promote the establishment of an eco-industrial complex or eco-industrial networking relationships between businesses in SEFC.

**Objective # 7 - Increase the technical capacity, skills and knowledge of all stakeholders relating to innovative urban agricultural systems:**

- Retain the control of some land at SEFC (at least for a few years) and either:
  - Invest directly in demonstration projects to demonstrate the feasibility of novel technologies such as tank-based aquaculture/biaponics and/or a small-scale urban commercial greenhouse operated organically and retailing directly to the public; and/or
  - Request proposals from urban agriculture entrepreneurs/NGOs to establish novel demonstration projects with multiple benefits and develop detailed agreements that ensure the projects are conducted according to established City goals.
- Partner with academic institutions and NGOs to develop a food incubator that trains and provides support for food entrepreneurs.
- Hire an urban agriculture expert/animateur that would provide advice, training, co-ordination and research support to gardeners and small-scale commercial operators.

**Objective # 8 - Encourage the celebration of food and the local food system:**

- Program food-related events at the local neighbourhood centre and/or school and other public open spaces in SEFC;
- Encourage the establishment of outdoor farmers markets to celebrate local food and farmers.

A related objective, but one over which the City has little influence, is:

**Objective # 9 - Encourage food consumed in SEFC that is produced in other regions or countries to be food produced through ethical and environmentally sustainable business practices:**

- Provide and encourage the provision of information to consumers regarding fair trade and sustainable farming practices.

In addition to these strategies specific to each objective, there are a number of actions that will assist with co-ordinating and linking an overall strategy:

- Provide a clear policy statement regarding which urban agriculture options the City will encourage at SEFC so that all stakeholders are clear about the city's level of commitment to sustainable food activity;
- Review regulations and bylaws that currently restrict urban agriculture and negotiate changes or flexibility in interpretation;
- Create new regulations, bylaws and design guidelines that require or encourage those urban agriculture practices (or opportunities) deemed appropriate for SEFC.
- Incorporate urban agriculture into the site planning and design process for new residential and commercial buildings/projects at SEFC;

- Use public buildings and land for demonstration projects that might include a small-scale commercial greenhouse at grade, an eco-industrial food complex, an aquaculture/biaponics project, and a commercial rooftop garden;
- Draft a package of incentives, including density bonusing/additional FSR, DCL/CAC reductions, taxation credits to encourage private developers to include urban agriculture opportunities in their designs;
- Partner with NGOs to develop training modules for staff, designers and urban gardeners.
- Start with the easy options, and work with stakeholders to build success and support before moving on to more difficult options; and perhaps most importantly
- Develop a neighbourhood culture that celebrates local food, agriculture, organic production and biodiversity so that urban agriculture becomes an acceptable part of the urban environment.

## 1.0 Introduction

The City of Vancouver has embarked on an innovative planning exercise that will lead to the development of a model sustainable community on the Southeast shore of False Creek. Having created an award winning Policy Statement that recognized the potential value of urban agriculture in a sustainable urban community, the City is in the process of developing an Official Development Plan for the area. The ODP will inform the site layout, building massing, and detailed policies for the area and eventually guide the re-zoning of individual parcels. A number of sustainability studies have been commissioned to assist with the identification and resolution of key issues and topics that should be addressed at the ODP stage. The urban agriculture study is one of those studies.

### 1.1 Definition of Urban Agriculture

The term urban agriculture, as it is commonly used, refers to any agricultural production that takes place within the urban and peri-urban region. This could include the growing of food (vegetables, grains, mushrooms, even meat and dairy products), medicinal plants, herbs, and ornamental plants. It includes a diverse array of techniques and approaches ranging from backyard growing to large-scale urban market gardening, hydroponic greenhouses and aquaculture. It is not just community gardening although this is an important component in many cities. Food is of paramount importance because of its primary contribution to survival, health, culture and impact on the environment. This study primarily focuses on food rather than some of the other agricultural/horticultural products.

The study of urban agriculture is often focused on food *production* within a City, which predominantly means the growing of soft fruits, salad crops, herbs and vegetables. However, in a high-density community like SEFC some of the opportunities for food production are limited compared with neighbourhoods with a higher proportion of open space. The potential for addressing the issues of sustainability is likely to be greatly enhanced by examining other aspects of the food system such as how and where food is processed, and the manner in which it is distributed. In addition, there may be synergies that result from integrating food production with opportunities for processing and distributing food. Simply stated, there is more to the sustainability of the food supply than growing food.

Therefore, we have extended the scope of the study to the study of the urban agri-food system.

### 1.2 Purpose of the Strategy

The purpose of the urban agriculture strategy is to address how food production, processing and distribution can most effectively address the issues of sustainability in a high-density urban neighbourhood.

The terms of reference for this study identified the following needs:

1. Identify options for implementing urban agriculture in the proposed sustainable community
2. Assess these options based on a number of criteria
3. Develop a comprehensive strategy and implementation plan for urban agriculture in SEFC.

This study was divided into two phases. Phase 1 of the project involved developing a rationale for urban agriculture, identifying the current regulatory and policy constraints on urban agriculture, brainstorming

options for food production, processing and distribution. These options were then evaluated based on a number of criteria. Phase 1 included the following components:

1. Review applicable City standards
2. Research relevant case studies and background information
3. Develop a long list of ideas and approaches to food related activity at SEFC (options)
4. Develop and refine the evaluation criteria
5. Explore the concept of green roofs using an experts workshop
6. Conduct a stakeholders workshop
7. Consult with development industry

Phase 2 of the project involved refining the options based on feedback, and considering various options for implementation. This led to the development of an overall Urban Agriculture Strategy for Southeast False Creek. Phase 2 included developing implementation recommendations on how the preferred package of options for SEFC could take form.

### **1.3 Overview of this Report**

This report has been prepared to document both phases of research and analysis conducted for the purposes of developing an Urban Agriculture Strategy for SEFC. The report is intended to help all stakeholders understand the characteristics of the existing food system, and a range of approaches the City might adopt that relate to food.

This report:

1. Lays out the rationale for considering urban agriculture in a high density urban neighbourhood;
2. Presents a number of City policies, regulations, guidelines and standards that are relevant to urban agriculture;
3. Develops a number of strategic objectives for urban agriculture at SEFC as well as actions and policy directions to help achieve each objective;
4. Explores practical opportunities (options) that exist for food-related activity in SEFC;
5. Documents case studies and research including precedents and data to support these opportunities;
6. Evaluates each of the opportunities according to a set of criteria and provides recommendations about how (or whether) to proceed with each option; and
7. Provides recommendations regarding implementation tools suitable for different types of site, buildings and ownership.

Combined, this work represents a comprehensive strategy for urban agriculture at SEFC.

This is a strategic planning report. It is not intended to explore the detailed design of options such as community gardens, rooftop spaces or commercial food facilities. Eventually, this detailed work will be required. This report provides recommendations for how implementation steps might best be achieved at each stage of planning and approval. However, in order to make strategic decisions it is necessary to follow a line of reasoning through to a sufficient level. Therefore, this report offers some detailed



quantitative and qualitative analyses of the various options so that all stakeholders can appreciate their implications.

## 1.4 Methodology and Approach

Four workshops were held to assist in developing the ideas for this study. A workshop was held in August, 2002 with advocates of urban agriculture to develop initial ideas and perspectives around urban food related activity, some of the barriers that exist and how these could best be overcome.

An “agricultural green roofs” workshop was held with city staff, and design professionals with expertise in greening roofs, to discuss the key differences between agricultural and non-agricultural green roofs and to develop initiatives for how agricultural green roofs would be incorporated into future real estate development projects.

A meeting with representatives from the development community was held to discuss possible concerns that developers may have with some of the options and ideas and solutions were discussed.

The Phase 1 report was reviewed by stakeholders and used as the basis for discussion at a stakeholders’ workshop.

The input and comments received from stakeholders regarding the Phase 1 report have been incorporated into this final report.

In addition, a literature review and web research discovered a number of case studies that serve to illustrate the various options.

### Key Issues

The key questions regarding food related activity and a sustainable community that this study addresses are:

- How much food can/should be produced at SEFC?
- What land (and how much) should be dedicated to food-related activity?
- What techniques should be used?
- Can commercial operations/jobs be supported?
- What are the opportunities for re-using wastes and closing the nutrient loop?
- How can the maximum amount of energy and water be saved?
- What are the appropriate implementation tools for different parcel, building and ownership types?
- How much urban agriculture should be mandatory vs. voluntary?

We have attempted to answer these questions by first exploring the various options for food related activity, discussing their potential, requirements, pros and cons of each one, and evaluating each on the basis of a pre-determined criteria.

Each option is discussed in a consistent format utilizing the following headings:

- General Description
- Benefits
- Type and Size of Space Required
- Amount of food that could be grown (or processed/delivered)
- Challenges
- Cost (where known)
- Evaluation based on social, economic and environmental criteria
- Implementation (considerations and recommendations)
- Case Studies and Precedents

### **Evaluation of the Options**

The City has asked that each option be evaluated against a set of criteria they provided. These criteria have been supplemented with criteria developed by the consulting team in consultation with other stakeholders. This study evaluates each option against a set of social, environmental, economic and other criteria:

Most of the evaluation is necessarily qualitative but in some cases we have attempted to provide a quantitative evaluation of each option. A summary of the evaluation and further discussion of the criteria appears as Appendix D.

## 2.0 Background and Context for the SEFC Project

Having created a Policy Statement for SEFC (1999) the City will soon develop an Official Development Plan (ODP) for SEFC. The ODP will broadly address the issues of land use, site layout, building form and massing, park location, road layout and widths, public amenities, and provide general design guidelines. The ODP is a high level planning and policy document and will guide the more detailed planning work of subdividing land, re-zoning of individual parcels and approving development permits for specific projects.

### 2.1 The Site

The SEFC site (Figure 2-1) is comprised of 50 acres of city-owned land (bounded by False Creek, Quebec Street, Cambie Street Bridge and 1<sup>st</sup> Avenue) and 30 acres private land (between 1<sup>st</sup> and 2<sup>nd</sup> Avenue and between Quebec St. and Main St.). Most of the City-owned land has been used for industrial purposes and there are significant soil contamination issues on some parts of the site.

**Figure 2-1: Aerial Photo of SEFC Site. Source: [www.city.vancouver.bc.ca](http://www.city.vancouver.bc.ca)**



## 2.2 SEFC Project Goals and Objectives

The future development of this site has been chosen by City Council to be a model of sustainable, high density urban development. Basic goals and policies have been established in the *SEFC Policy Statement: Towards a Sustainable Urban Neighbourhood and a Major Park in Southeast False Creek* approved by Council in 1999. This document states:

*SEFC is envisioned as a community in which people live, work, play and learn in a neighbourhood that has been designed to maintain and balance the highest possible levels of social equity, livability, ecological health and economic prosperity, so as to support their choices to live in a sustainable manner. (p.7)*

An earlier consultant's report (Sheltair, 1998) defined goals (and targets) for the planned community.

These included:

- Maximize the diversion of all wastes from disposal
- Maximize sustainable and efficient use of energy resources
- Minimize the need to expand the energy infrastructure
- Minimize the need to travel outside
- Minimize the health and environmental risks from contaminated soils
- Maximize the productivity of local soils
- Maximize the efficient use of fresh water
- Minimize water pollution
- Minimize the need to expand the existing water infrastructure
- Maximize site diversity
- Maximize vegetative cover and biological productivity
- Maximize the efficient use of material resources
- Maximize the use of materials from sustainable sources
- Optimize connections between built and natural environments
- Achieve a reasonable return on investment
- Maximize local, sustainable economic activity within SEFC
- Maximize opportunities for community participation, interaction and empowerment
- Maximize the health, safety and livability of the community
- Maximize arts, cultural and recreational activities within SEFC
- Maximize linkages between SEFC and neighbouring communities
- Maximize educational value of SEFC as a sustainable community
- Maximize the heritage value of SEFC

The Policy Statement created objectives for Urban Agriculture at SEFC:

1. To establish clarity on the role that food production should play in the development of a sustainable city and neighbourhood; and
2. To use urban agriculture and community gardens to assist in meeting other social, environmental, and economic objectives in SEFC.

The document went further in suggesting:

“An urban agriculture strategy should be developed for SEFC by the City in consultation with the developer. This plan may consider issues such as:

- a) The city’s role and responsibility in securing a food supply for its population;
- b) Opportunities and constraints with regard to urban agriculture which can reasonably be addressed in SEFC;
- c) Gardening opportunities on private land, rooftops, and in public parks;
- d) Regulatory issues.”

## 2.3 The development sequence of the SEFC project

- Council Directive - Develop a model sustainable community at SEFC - 1994
- Policy Statement - Develop an Urban Agriculture Strategy -1999
- Sustainability Studies 2002
  - Energy (completed)
  - Water/Wastewater (completed)
  - Solid Waste (completed)
  - Transportation (completed)
  - Urban Agriculture (this study)
  - Merger Study (forthcoming)
- ODP – general layout, policies, guidelines
- Re-zoning of individual parcels
- Development Permits/Building Permits

## 2.4 Draft Structure plan

“[Since approval of the policy statement] staff from several departments (together with consultants Baker McGarva Hart Architecture) [now VIA Architecture] have worked to complete a draft basic site structure plan that begins to give form to the urban design policies in the Policy Statement. This means that general form and siting have been established for streets, block structure, allocation of densities and the park itself, but is by no means a final design for the site.

The draft basic site structure plan will act as a base for five environmental plans required by the Policy Statement - Waste Management, Water Management, Energy, Air Quality and **Urban Agriculture**. These plans will provide guidance towards the sustainability goals of the project and should be complete by spring of 2002, at which point the basic site structure plan will be revised, as appropriate, to incorporate directions from the resulting plans. This will become the basis for a preliminary Official Development Plan which will undergo a broad public consultation process with stakeholders and all those interested in the development of Southeast False Creek”  
([www.city.vancouver.bc.ca](http://www.city.vancouver.bc.ca))

The draft structure (Figure 2-2) plan indicates the following basic parameters for the future community<sup>1</sup>:

- 10,900 – 13,800 residents (135 to 170 persons per acre)

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<sup>1</sup> The information that follows was provided by the City of Vancouver.

- 6040 residential units (5.36 million sq.ft.)
- On city owned lands, 2350 residential units (20% non-market, 35% family housing)
- On private lands 3690 units
- Overall density (75 units per acre, FSR of 3)
- 250 –300 employees,
- K- 7 Elementary School (500 students)
- Up to 5 (50-70 space) daycares
- After school programs
- A 26 acre (10.5 Ha.) waterfront park serving the new community and the Mt. Pleasant neighbourhood.
- A Neighbourhood Centre (small community centre without pool)
- Facilities for non-motorized boating

**Based on the draft structure plan for the City-owned part of the site (approx. 50 acres, 20 Hectares)<sup>2</sup>:**

Number of buildings	75
Type of buildings	Mainly tower and podium (concrete and steel frame construction) with some medium rise and low rise buildings
Floorplates (and roof deck areas):	From 200 to 1200 square metres.
Total area of building footprints (and therefore rooftop space)	38,496 sq metres (approx. 4 hectares)*
Total area of semi-private and private landscaped open space (not including right-of-ways or park)	33,652 sq. metres (approx. 3.4 hectares)
Total park area	10.53 hectares
Number of buildings with commercial use on first (and possibly second floors)	9

**Table 2-1: Basic data for public lands at SEFC**

**Based on the draft structure plan for the privately-owned part of the site (approx. 30 acres, 12 Hectares)<sup>3</sup>:**

Number of buildings	82
Type of buildings	Tower and podium (concrete and/or steel frame construction) with some low or medium rise buildings
Floorplates (and roof deck areas)	From 200 to 1400 square metres.
Total area of building footprints (and therefore rooftop space)	46,309 sq. metres (approx. 4.5 Hectares) *
Total are of semi-private and private landscaped open space	34,574 sq. metres
Total park area	0 hectares
Number of buildings with commercial use on first (and possibly second floors)	unknown

**Table 2-2: Basic data for privately-owned lands at SEFC**

\* Sculpting of some buildings may result in a smaller rooftop area.

<sup>2</sup> The following information was calculated from the draft structure plan provided by the City of Vancouver.

<sup>3</sup> The following information was calculated from the draft structure plan provided by the City of Vancouver.

The total area of road right-of-ways on whole site (including lanes) is 6.27 Ha.



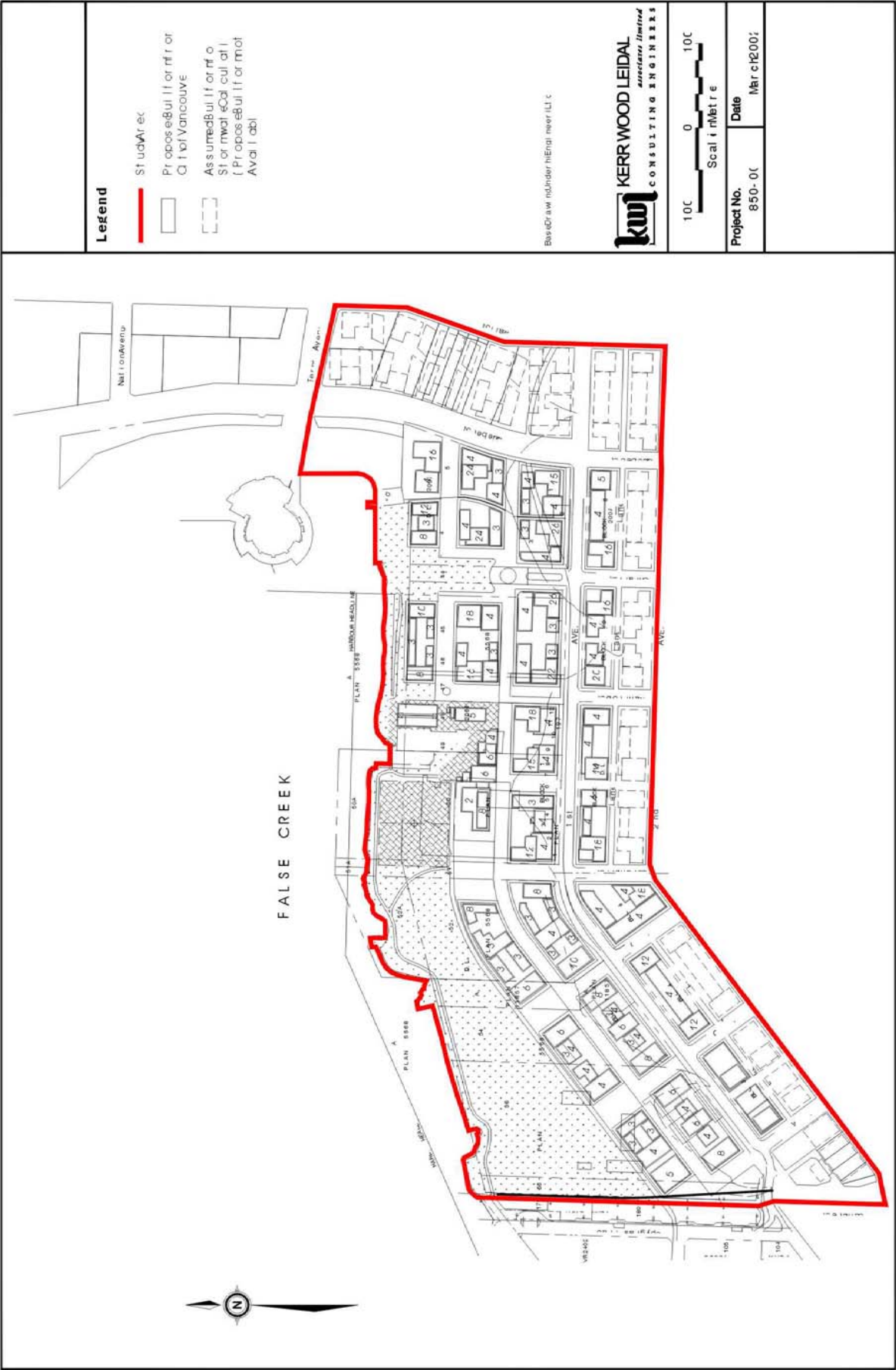


Figure 2-2: Draft Structure Plan: Provided by City of Vancouver.



## 3.0 Food, Agriculture and Sustainability

The section explains the different elements of the food system and why we consider the current food system to be not sustainable. It describes the rationale for and potential benefits of urban agriculture, as well as the trade-offs and challenges that complicate these benefits. This section also discusses the viability of small-scale commercial food enterprises, the yields of different growing methods, food miles and greenhouse gas emissions, and the term “organic”.

### 3.1 The Food System

The notion of different stages that food goes through has prompted us to adopt the concept of the food system as our framework for analysis (Kneen, 1992). The food system (Figure 3-1) approach is an attempt to simplify the complex, related elements that get our food from the field to the table. The food system is comprised of several elements including:

- Food production – i.e. farmers and urban growers
- Food warehousing - collection and storage of food
- Food processing – turning raw food stuffs into value added food products
- Food distribution – such as retail stores, direct home delivery, farmers markets
- Food preparation and consumption – at home, restaurants, emergency food programs
- Export, food aid – food that is exported to other countries either for profit or as an overseas aid program
- Emergency Food Services – food banks, meal programs, to feed those who cannot afford to feed themselves.

There are economic, social and environmental (sustainability) implications at each stage within this system. Each stage of activity has the potential to generate economic activity and jobs but also to present an opportunity cost to various players. Each stage has the potential to increase the recreational opportunities and social well-being of the community. And finally, the various inputs required and waste and potential pollution generated will have an effect on the environmental, ecological impact of the activity.

### 3.2 How sustainable is our current food system?

To be “sustainable” a system must be capable of properly functioning over a very long time horizon (permanently unless a substitute system can be devised). Ultimately, the question of whether or not a system is sustainable can only be answered at the global level because the ecosphere is the only fully bounded system – i.e. all its component subsystems are ultimately tied together by physical exchanges, networks of trade and interdependencies. At the global level there are indications that our current direction is not sustainable including:

- Climate change (global warming) as a result of greenhouse gas emissions especially carbon-dioxide;
- Plateauing of the global fish catch;
- Accelerating species extinctions (and de-populations) and resultant loss of bio-diversity;
- Loss of forest and wetland ecosystems;

- Predicted plateauing of world oil production within this decade but a lack of clear action to develop realistic alternatives.

While there are a host of factors influencing the topic, discussions of sustainability ultimately come down to the very basic requirements for survival – energy use (and its consequences), water consumption and pollution, air quality, climate and food. The food and agriculture system is linked with the sustainability of the planet in numerous ways. There has been a vast amount written about how unsustainable the food system is and it is beyond the scope of this report to do more than summarize some of this material and present a few of our own thoughts on the matter. This report is not intended as an exhaustive analysis of the problems with the current food system. There are many other documents that study this topic in detail<sup>4</sup>. However, the following is a brief overview of why we consider the food system, as currently organized and operated, to be a major contributor to unsustainability.

- **Food is often produced far from the point of consumption** - this means it has to be wrapped and packaged, creating waste. Large amounts of transportation is involved. In the UK food-related transportation is responsible for one quarter of all journeys and 12% of fuel consumption (Garnett, 1996). It also means that food is bred to be durable (able to take rough handling and last a long time on the shelf) and uniform so that packaging is simpler. This occurs to the detriment of nutrition, taste and diversity.
- **Food production uses large amounts of energy for machinery** - we now use 20BTU's of fuel energy to produce 1 BTU of food. In comparison in 1910 this ratio was 1:1. (Ross, 1980)
- **Food is produced using a vast array of often toxic chemicals** - These substances constitute a threat to the health of human beings, wildlife and the soil.
- **Synthetic fertilizers** manufactured from fossil fuels are used to replace the nutrients which are lost from the soil
- **Modern farming is predominantly mono-culture** - farming is increasingly a mono-cultural activity. Large areas are sown with identical crops and every other species eradicated. The use of artificial fertilizers, farming unsuitable land, and inappropriate farming practices, cause the loss of 24 billion tons of topsoil each year.
- Our diet is becoming **increasingly simplified**. Humans now rely on only 30 species of plants and animals for 95% of their diet - historically 3000 species have made up our diet. (Kneen, 1989)
- **Much of our food is highly processed and refined**, and contains many chemical additives. The US surgeon general's 1988 *Report on Nutrition and Health* estimated that 10,000 cancer deaths are caused annually by food additives alone.
- **Water used for irrigation** is, in some cases, drawing down aquifers and salinizing soils.
- **We rely on imports from fragile political economies**, some of which struggle to feed their own people.
- **The local and global agricultural land base is shrinking** - despite the ALR (provincial legislation that protects most productive farmland) BC continues to lose agricultural land to development pressure and non-farm uses. Compared to Washington State which loses on average 30,000 ha. per year, BC is

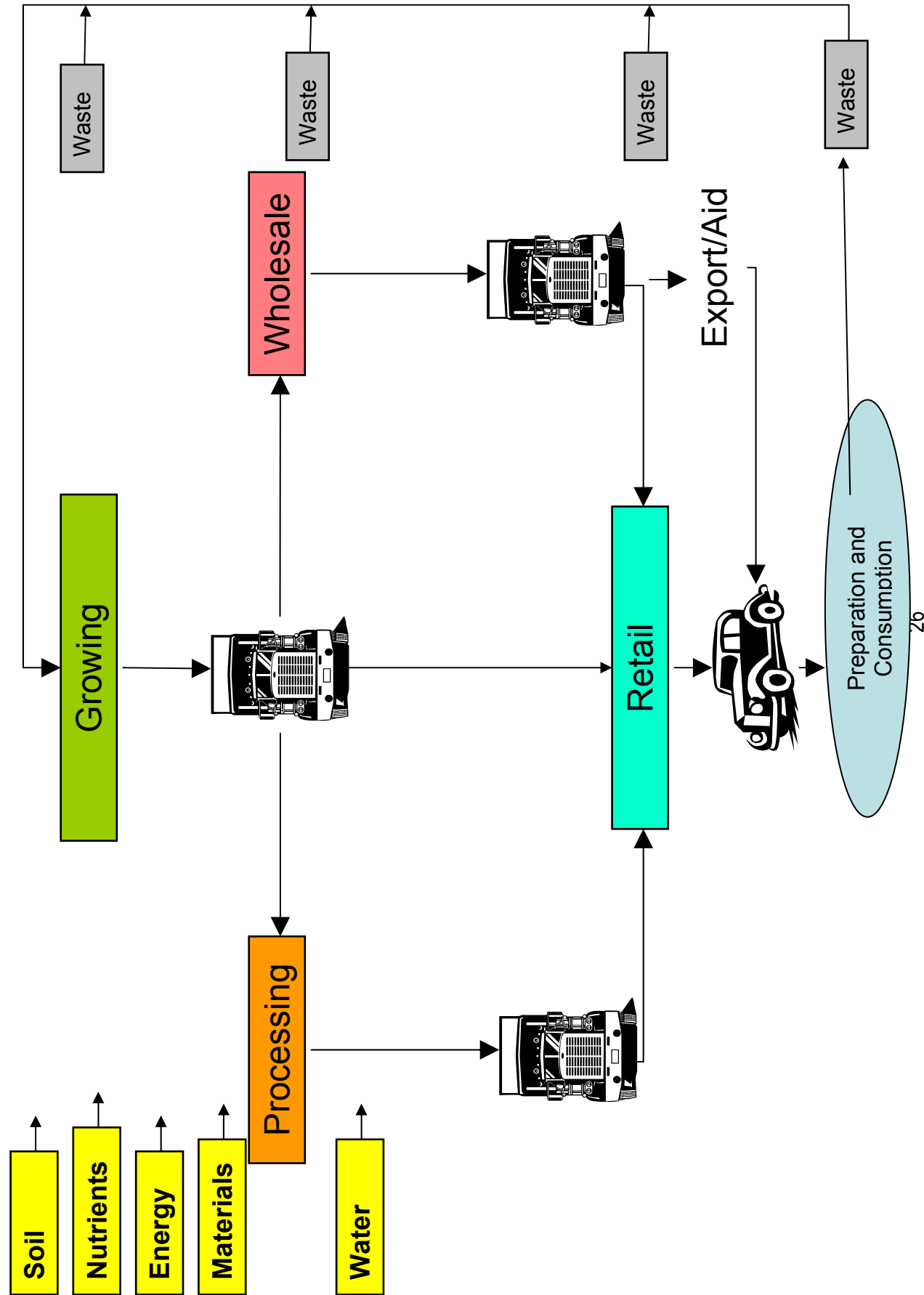
<sup>4</sup> See for example Barrs, 1997; Kneen, 1989.

doing well . However the loss of prime agricultural land on a continent-wide and global basis may be a real threat to food security as populations grow.

- **We are disconnected from the land** – Most urban people are increasingly separated from the complex ecological processes that need to be understood to properly manage the land.
- **Hunger and reliance on food charity** - 2.5 million Canadians (including 700,000 children) estimated to use emergency food services in 1995. Globally more than 800 million people do not have enough food to meet their basic nutritional needs.
- **Threat of increasingly inadequate food supplies** - due to declining agricultural land-base, soil degradation, growing populations and reliance on imports. The world's farmers may find it difficult to increase yields to match the demands of rising populations and diets that are increasingly protein rich.
- **Poor Health & inadequate nutrition** - Diet is a major factor in the development of non-communicable disease. 64% of deaths in BC are related to cancer or cardiovascular disease which are diet-related diseases.
- **Environmental degradation** – the current farming system produces waste and pollution on a large scale - contamination of water bodies, atmospheric pollution and climate change, declining soil fertility and soil erosion, destruction of critical habitat and wildlife. The “ecological footprint” of our food consumption is significant - 1.3 hectares for food consumption alone. (Rees and Wackernagel, 1996)
- **Loss of farming jobs and real incomes** - declining farm populations. Farmers often have huge debts and consequently low real incomes.

None of these factors alone is enough to justify the claim that the food system is unsustainable, but each reveals a trend that cannot be sustained over a long period of time without unfortunate consequences.

Figure 3-1: The Food System



### 3.3 The rationale for urban agriculture

Urban agriculture may seem an odd topic for a planning study. It certainly is a little different from the traditional topics of planning which has, perhaps surprisingly, ignored the community food system in urban areas until relatively recently. However, as the previous section showed, our relationship with food is an important part of our relationship with the environment and has important implications for social and economic well-being.

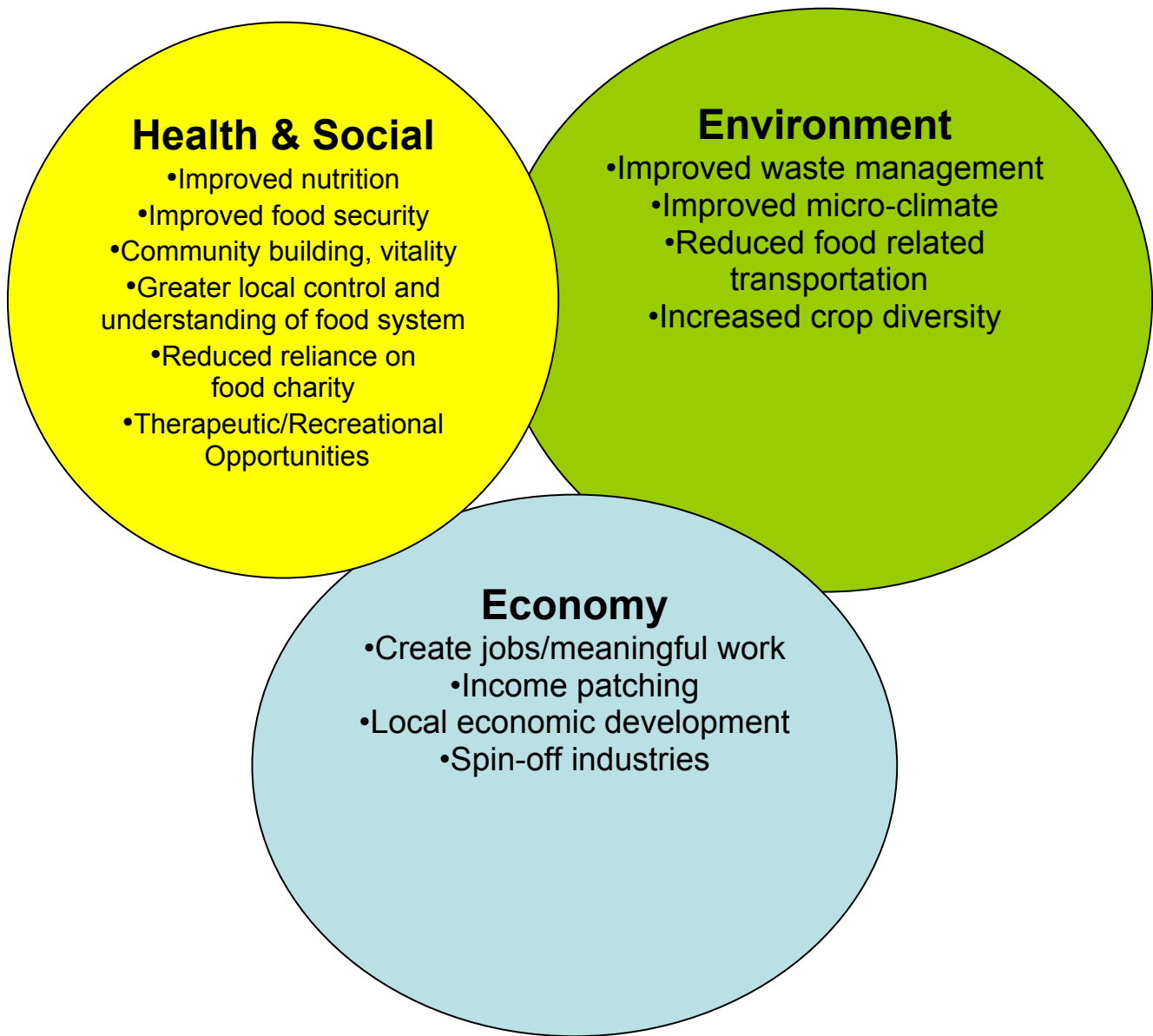
When thinking about food at the scale of an urban community, it may be helpful to think of food as flowing from the productive hinterland (the environment) through the community (where activity takes place) back to the environment in the form of wastes.



Food should be seen in the context of sustainable development as a “flow” similar to the flow of energy, water, and waste where how we address this flow affects the relative sustainability of our community.

Urban Agriculture offers many opportunities to support the development of more sustainable high-density neighbourhoods. Urban Agriculture can not only help neighbourhoods to respond to the new objectives of sustainability, but also support other more traditional objectives promoted in the City, such as enhanced liveability, local social networks, leisure and recreation opportunities, and cultural and demographic diversity. As such, urban agriculture systems can be seen as another instrument in the City’s planning toolbox.

Local, sustainable food systems offer many social, economic, and environmental benefits, which are summarized in Figure 3-1.



**Figure 3-2: Potential Benefits of Urban Agriculture**

These benefits include:

- **Environmental** — the way in which food is produced has an impact on local environmental conditions such as the ability to re-use of wastes, energy consumption (in the form of food-related transportation), and managing the local microclimate. If not managed properly it may also have negative environmental impacts such as noise, dust, odours, pollution of water bodies and increased consumption of potable water.
- **Economic** — The markets for food products, and the prices paid in these markets, influences the size and nature of food growing and food processing operations that can be economically viable.

Local, urban agriculture has the potential to generate primary local economic activity and spin-off industries and if managed properly to attract investment.

- **Social** — Food systems can play an important role in shaping a community's sense of itself, the relationship between community members and the connection with the land. Growing and processing food locally can also foster local self-reliance. Other important social implications of food systems include consumer nutrition and access to an adequate food supply by all community members.

There is the potential for community-based food systems to improve local economic, environmental and social conditions. With respect to this study, the new community at Southeast False Creek offers an ideal pilot site for testing many sustainable community food system techniques.

Food is so essential to our everyday lives it is easy to forget its importance to the health of our bodies, the environment and the economic system. Beyond the practical considerations of food and food related activity we should recognize that food is a vital part of healthy, vibrant community that touches many aspects of our daily lives. As Tim Lang (1997) puts it:

*In our daily lives, we meet for meals. We cement our loves and domestic life over meals. We care through food. We exploit and give pleasure through food. We also hate through food. We argue over meals. We oppress each other over food. We fight with and over food. We express loyalty through food.*

### 3.4 General Issues and Perspectives

Through the course of our research, brainstorming and discussion with stakeholders, several important issues have come to the fore that are worth highlighting before we delve into a discussion of specific options for SEFC. These issues should be kept in mind as Urban Agriculture Strategy for SEFC is developed:

- **Means and Ends** -How and where we produce and process food is a means to more fundamental ends such as the ongoing productivity of soils, nutrition and health, community vitality, reduced energy consumption and the minimization of pollution and wastes – all key aspects of sustainability. When considering the merits of strategic directions and options we should reflect on how each affects these fundamental ends.
- **Tradeoffs are Involved** -The choices the City has to make regarding *how much*, *what type*, and *where* urban agriculture occurs involve difficult trade-offs where the most “sustainable” choice is not necessarily clear.
- **Synergies** -The benefits of any one aspect of urban agriculture might be quite small – the strength of urban agriculture lies in its ability to address multiple objectives through multiple functionality
- **An integrated food system** - The greatest benefits can be obtained through integrating different aspects of food related activity – food production can be combined with processing and retailing options to deliver a connected food system that maximizes benefits.

- **Opportunities for education** - Food and agriculture is one of the more visible indicators of human beings relationship with the planet. It is therefore a highly charged, emotional issue for some and also offers many opportunities for education regarding our relationship with ecological processes.
- **The urban context** - SEFC is proposed as a high density, medium to high-income neighbourhood with 20% non-market housing and 35% family housing. It is a very different context from many of the case studies of successful urban agriculture which have thrived in low-income neighbourhoods with underused land. In this context the appearance of urban agriculture will have an impact on real estate values – therefore, design and aesthetics are an important consideration here.
- **More than gardening** - Urban Agriculture does not just mean gardening – it is important to consider commercial as well as less traditional high-technology approaches that may be more appropriate for a modern, high density, urban community.
- **Limited potential for food self-sufficiency on-site** - Although producing some food within SEFC is possible and probably desirable, it should be noted that even using current technologies, it is not possible to grow the majority of food required by the 11-13,000 residents of the community. It may be possible, with some effort and attention to this issue, to grow a large percentage of soft fruit and vegetable needs, but the majority of demand for meats, dairy products, grains, and tropical foodstuffs cannot, of course, be met within the community.
- **Relationships with offsite food enterprises** - Given that the majority of food will continue to come from off site, it is important to consider how relationships with off-site food growers and processors can be developed so that the sustainability in a regional and global context is encouraged.
- **Different Cultures, Different Food** - It is important to remember that different cultures have very different food tastes and requirements. A stroll in Vancouver's China Town will quickly reveal very different food items to those found in Kitsilano. One key to the 'lack of farmers' issue is to train recent immigrants in producing traditional or ethnic crops in the city. An example of this is being done by Cornell University in NYC. *New Farmers, New Markets Program*. Another success story using this approach is Bayview, San Francisco, an African-American enclave where ethnic foods such as collards and basic and black-eyed peas are grown.<sup>5</sup>
- **Generating clean compost** - It is important that any composting of organic waste at SEFC is done in such a way as to produce uncontaminated compost material for use in urban agriculture.
- **Food Gardening remains a very popular activity** - a recent poll conducted by Ipsos-Reid on behalf of City Farmer – Canada's office of Urban Agriculture discovered that 44% of people in the GVRD live in households that produce some of their own food.<sup>6</sup>
- **Compatibility with high density housing** - SEFC has been established as high density housing near to transit and downtown jobs. Therefore, it is not appropriate to zone large areas of land for agriculture in the new community that would compete with its use for residential development. It is probably more appropriate to practice urban agriculture on the interstitial spaces where it complements the primary function of the new community.

<sup>5</sup> John Nettleton, Cornell Coop Extension/NYC, [jsn10@cornell.edu](mailto:jsn10@cornell.edu), (212) 340-2937

<sup>6</sup> City Farmer, Press Release, Sept 23, 2002.



- **Pricing** - The viability of commercial urban agriculture enterprises is heavily influenced by global and regional agri-food markets. While consumers may be willing to pay slightly higher prices for organic produce, we should not assume that they would be willing to pay extra for “grown in SEFC” produce.

The options brought forward in this report and the following discussion of trade-offs and challenges address these issues.

### **3.5 Trade-offs and challenges for Urban Agriculture at SEFC**

This section discusses some of the real or perceived challenges to urban agriculture. Most of these apply generally to urban agriculture, while others are more specific to SEFC. Consideration of these challenges goes some way to explaining why there is not more urban agriculture practised at this time.

#### **Lack of space to grow food/fragmented space**

Whereas some North American cities have large tracts of vacant land, space will be at a premium in SEFC. While there is a large park, most of the space has already been identified as necessary for recreational needs. Buildings and roads will occupy a large quantity of space. The remaining open space and rooftop space are smaller unconnected spaces which are not always ideal for commercial-scale growing.

#### **High value of land for other uses/low economic return for agriculture**

The land around False Creek represents very high value in terms of real estate. Both the City and private land owners expect to see a reasonable return on their land assets. Typically, urban land zoned for high density residential development in Vancouver will bring returns far higher than urban food producers are willing to pay. This means that even if commercial urban agriculture were permitted as a land use at SEFC, left to market forces urban it will not happen at SEFC without government intervention or market place.

#### **Land-use conflicts – noise, dust, odours, untidy**

While urban food production can be an interesting and even beautiful addition to a community, it can also produce noise, dust, unpleasant odours and a perception of untidiness. These are factors that also confound farmers on the urban fringe and, if not addressed, can lead to conflicts.

#### **Security – theft, vandalism**

Some urban agricultural initiatives have been troubled with theft and vandalism, which in turn can lead to disheartened urban farmers.

#### **Technical Limitations**

Whereas most people can grow a few tomatoes in their backyard successfully, producing a wide range of healthy soft fruit and vegetables requires some experience, perseverance, attention to detail and in some cases training. The special requirements of rooftop gardening may be especially challenging. It is not that it is difficult to produce some plants but growing in commercial quantities to commercial standards requires a good measure of technical knowledge, skill and experience.

## **Lack of interest in working with the land**

Although gardening is one of North America's most popular activities, not everyone has green thumb. This is especially true when it comes to vegetable gardening. There may be a shortage of skilled urban farmers able to extract a living from small urban spaces.

## **Few Economic Incentives**

Although it is possible to save some money on grocery bills by growing food, food is relatively cheap. Most people can generate more money working at their specialized area of employment than they can save growing food.

At a commercial scale, it is possible to grow food commercially on fairly small pieces of land, but the high price of land, high taxes, mean that land uses that generate higher incomes are likely to edge out low value agricultural uses.

## **Legal Liability**

Liability issues are of concern Improper handling/storage of food crops can pose dangers For example, the leaves of Rhubarb are poisonous and must be removed before being sold. Potatoes stored in lighted areas turn green and can make someone sick if consumed. Similarly, processors who do not properly label the ingredients of their foods can create risks for people with allergies.

## **Air Pollution and Contaminated soils**

The industrial history of most of the site means that large tracts of lands are contaminated. These contaminants could enter the food supply unless measures are taken to ensure that the soil is remediated or that growing occurs in beds sealed from contaminants.

*Pollution of the food by the environment is one of the fears that constrains the expansion of shallow-bed farming in town. Tests carried out by the Russian State Committee on Standards showed almost identical results to those of Cornell University in New York: produce grown on rooftops contained up to ten times less contaminants than produce bought at local markets or grown on suburban plots. (Smit et al., 1996)*

## **Lack of Regulatory Authority and Novel Skills**

It is not appropriate for the City to force people to grow food. Generally the approach needs to be one of encouragement, incentives and in some cases requiring the mandatory provision of design elements (rooftop gardens on residential buildings for example).

There will be a learning period for city staff who deal with approvals and inspections. While it may be easy to require certain design standards of developers and their architects, ensuring that those standards are met in the completed building and still in place and properly functioning two years later will be a challenge. For example, landscape design standards for SEFC may stipulate the inclusion of fruit trees and nut bushes as part of an edible landscaping approach. However, for this to be successful, the landscape architect has to know how to specify a suitable tree, the landscape reviewer has to know how what to look for when approving the landscape design, the contractor has to understand the horticultural value of such a

tree and the special requirements for proper growth and the building inspector has needs to familiar enough with fruit trees to be able to inspect and approve the installed landscape. This is just an example of the challenges faced at the regulatory level if elements of urban agriculture are to be mandatory.

## **Solar Exposure**

Most food plants require full sun over most of the day to be grown effectively and deliver the quality expected by consumers. The high density, high rise and medium rise buildings of SEFC require attention to solar access to ensure adequate solar access is sustained. Many rooftop gardens and rooftop greenhouses will, of course, have maximum solar exposure and may even need frequent irrigation and partial shading for sensitive plants.

## **Perception of agriculture being inappropriate in a City**

When transportation and refrigeration technology improved to the point where it was possible to cheaply transport of all kinds of foodstuffs, agricultural shifted almost exclusively to rural land and gradually the division between rural activities and urban activities became far more pronounced than it once was. It has now been so many decades since agriculturally was an integral component of cities that, to many, the very idea of agriculture in an urban environment seems inappropriate. Agriculture is associated with dirt, odours, insects and other undesirables and this association seems to fuel many of the negative perceptions of urban agriculture.

## **Policies and Regulations that Inhibit Urban Agriculture**

Appendix B contains a review of various legislation, policies and guidelines that are relevant to Urban Agriculture at SEFC. Many of these regulations were not written with Urban Agriculture specifically in mind and in some cases unintentionally restrict food related activity in urban and suburban settings.

### **City of Vancouver – Public Health Bylaw**

Perhaps the most important municipal regulation is the City of Vancouver Public Health Bylaw. This document sets standards for food operation and food handling and requires that food prepared for retail consumption come from approved sources

In addition the by-law prohibits livestock in the city including bees. This reduces the capacity to recycle waste and produce a protein component to the diet. However, the keeping of fish for food purposes is not addressed.

### **Provincial and Federal Food Handling Standards**

The provincial and federal governments generally set standards for food safety, which are typically enforced by municipal government officials. Provincial and federal government departments are primarily concerned with the design of food processing facilities, proper handling procedures, control of pests, proper sanitation and general hygiene techniques.

### **City of Vancouver Street Tree Guidelines and Landscaping Standards**

A series of standards, bylaws, policies and practices are in place which both implicitly and explicitly limit the extent to which urban agriculture could occur within South East False Creek. Although, at present, these

approved and de facto practices would pose barriers to implementing urban agriculture strategies they are all subject to review by staff and Council from time to time.

Although the majority of the applicable documents relating to trees and landscape plantings in the public realm do not encourage urban agriculture, they could, given appropriate guidelines, be permitted. This may occur through amendments, or the creation of guidelines specific to SEFC. Presumably, although not stated, the overarching goal of enhancing the urban forest and urban landscape is to improve the environmental and aesthetic integrity of the City. An effective urban agriculture strategy should support that goal and hence, related policies adopted, changed and created that articulate it for current and future property owners.

### **Zoning Bylaws**

Certain zoning regulations impede the development of sustainable food production systems. In most areas (all but RA-1, HA-1 and HA-1a zones) of the city, commercial greenhouses, field crops and nurseries are not allowed uses. In addition, building height restrictions reduce the possibility for rooftop gardens or greenhouses because these uses are included in height calculations.

## **3.6 Spaces Available for Food Production at SEFC**

The draft structure plan indicates the following spaces some of which could be used for growing food. The practicality of each is discussed later in this report:

- Private residential buildings (some have commercial at grade level) and associated landscapes including:
  - private outdoor spaces (backyards, balconies, window boxes and patios)
  - semi-private outdoor spaces (at grade landscaped areas); and
  - rooftops;
- Public Buildings and associated landscapes (controlled by the City of Vancouver);
  - at-grade landscaped areas; and
  - rooftops
- An elementary school controlled by the Vancouver School Board
  - Balconies and window boxes;
  - at-grade landscaped areas; and
  - rooftops
- Street rights-of-way
- Waterfront Park and ancillary buildings.

In addition, the following land uses/spaces are not planned for SEFC but the City might consider them:

- Stand alone commercial or industrial buildings;
- Spaces zoned specifically for agriculture – none at present
- Floating barges on False Creek - none at present

### 3.7 The Viability of Small-Scale Commercial Enterprises

In the decades since World War II, farming has changed rapidly in scale and approach in many parts of the world. There has been a transition from small scale, animal powered agriculture with most agricultural products selling locally, to a globalized, highly mechanized system of agriculture where rural areas have been depopulated and large scale mechanization has come to dominate.

However, despite this trend, the Lower Mainland of British Columbia has retained a large number of small scale, family run farms that specialize in an eclectic variety of farm products (Robbins, undated).

Peri-urban farms in Burnaby's Big Bend are some of the best examples of very intensive vegetable crop production that are swimming against the dominant trend towards extensive, capital intensive mono-cultural production.

*"For agriculture in South Coastal, lot size is not strongly connected to level of output. The growth in output of poultry farms, mushroom farms, intensive vegetable farms did not come from obtaining more land but be being more efficient on the land they have.*

*Small agriculture lots emerged in the early 1900's as the efficient farm size to support a family. During the century their role has changes from hosting mixed farms, to being an efficient size for more intensive poultry and horticulture operations to being an ideal production unit and ideally located to respond to the growth in demand for locally grown direct marketed produce." British Columbia Ministry of Agriculture, Food and Fisheries. Small Lot Agriculture: The Role of Small Lot Agriculture in the South Coastal Region.*

This success of small scale farms prompts the question of whether commercial scale urban agriculture enterprises are viable at SEFC.

The average Canadian household spends \$5,686 /year on food - more than any other item except accommodation.<sup>7</sup> This figure represents over 12% of the before-tax income and nearly 18% of the average household's consumption. Low-income households spend as much as 30% of their income on food.<sup>8</sup> Meat and meat preparations represent the largest food expenditure at 18%, dairy products - 11%, fruit & nuts - 8%, and vegetables and vegetable preparations - 6.5%.

The average individual annually spends \$1,622.24 on food bought from stores and a further \$580.43 of food bought from restaurants making a total of \$2,202.67.<sup>9</sup>

The annual food grocery bill of 10,000 residents will be approximately  $10,000 \times \$1622 = \$16$  million per annum. Of this probably 14.5 % will be for the purchase of fruit, nuts, vegetables and vegetable

<sup>7</sup> Statistics Canada, Catalogue no. 62-555

<sup>8</sup> Agriculture Canada. *Handbook of food expenditures, prices and consumption*. Figures given are calculated from the lower quintile income group expenditures in 1989.

<sup>9</sup> Agriculture and Agri-food Canada, 1996. *Detailed per capita yearly food expenditures, urban consumers, 1996*.

preparations, products that could be produced and processed in an urban environment. The potential annual revenues therefore, from the sale of these food stuffs is over \$2 million.

### 3.8 Yields of different growing methods

Table 3-1 is based on the per capita disappearance of food in Canada during 1994/5 and is an approximation of the composition of the average Canadian diet. The average person consumes nearly 160 Kg of vegetables per year. By comparing the yields of various methods of production we can estimate the amount of land required to produce enough vegetables for a community of 10,000 people.<sup>10</sup>

Commodity	Per Capita annual consumption (kg)
Vegetables (incl. tomatoes)	159.10
Tree Fruit	56.81
Berries	9.01
Cereals/Grains	70.18
Rice	6.57
Sugars and Syrups	19.09
Pulses and nuts	8.04
Oils and fats (excluding butter)	21.38
Fish & Shellfish	7.84
Pork	27.69
Beef	31.39
Veal	1.36
Mutton & Lamb	0.79
Poultry (eviscerated weight)	30.50
Eggs	9.8
Dairy Products (Fresh milk equiv.)	204.07

**Table 3-1 Average per capita annual consumption of common foods. (source Statistics Canada (d))**

#### Conventional Horticulture

Conventional horticultural and open field methods produce, on average in British Columbia, 17,600 kg of vegetables per hectare.<sup>11</sup> Therefore, to produce the vegetables adequate for a community of 10,000 people for a year (based on an average consumption of 160 kg/person/year<sup>12</sup>) would require 91 hectares of land.<sup>13</sup>

<sup>10</sup> We have used the figure 10,000 residents for ease of calculation and comparison. The actual number of residents at SEFC is likely to be between 11 and 13,000.

<sup>11</sup> Based on total 1992 BC production of vegetable crops divided by total acreage under production. British Columbia Ministry of Agriculture, Fisheries and Foods. 1992.

<sup>12</sup> Based on annual per capita disappearance of fruit and vegetables in Canada (Agriculture Canada, 1990).

<sup>13</sup> 10,000 people X 160kg = 1,600,000 kg of vegetables per year. 1,600,000kg / 17,600 kg/Ha. = 91Ha.

## Backyard/Community Gardening

The yields obtained from allotment and backyard gardens vary tremendously as shown by the Philadelphia urban gardens report (Blair et al, 1991). Various experts have estimated the amount of land, required to feed a family of four, fruit and vegetables for the year. According to Levenston (1980) “Bernard Moore, a local garden expert, says that 2400 square feet of land (40' x 60') will provide a family of four with ‘more than enough fresh vegetables plus sufficient to can or freeze for the winter.’ [This would be equivalent to 26, 000 kg/ha.] Alan Littler, a senior Ministry of Agriculture horticulturist says that 1000 square feet will feed the same family.” Levenston also reports that the U.S. National Garden Bureau believes that the family of four can be fed from only 600 square feet of garden space (this would be equivalent to 104,000 kg /ha.) The fruit and vegetable needs for a community of 10,000 (i.e. 1,600,000 kg) would require between 15 and 61 hectares of land based on the above yields.

## Deep Bed Biodynamic Gardening

Jevons (1982), researching in California, has shown that a complete nutritionally balanced diet can be produced using an area as small as 2,800 sq. ft. (270sq metres). He shows that the year’s supply of vegetables and fruit for one person (he uses the figure of 320 pounds) can be produced on an area as small as 100 sq. ft. (9.5 sq. metres). This is equivalent to 156,000 kg /Ha. A community of 10,000 people using Jevons’ method would therefore require 9 Hectares of land to produce all its fruit and vegetable needs. This, however, assumes a very high level of gardening skill, adequate compost, and the figures are for Californian climates so we need too revise these production figures downwards. The high yields are achieved using large amounts of compost and Jevons’ (organic) deep bed cultivation method, which allows plants to be grown much closer together than conventional spacing. He recommends cultivating the soil to a depth of 24 inches using the double dig method so that the roots of plants are able to penetrate much deeper into the soil where they can find increased nutrients and water for rapid growth.

## Hydroponic Greenhouse Cultivation

**Hydroponic greenhouse methods of cultivation can be used very intensively because the nutrient supply and climate is artificially controlled. This method averages 14 times the yield of conventional open field methods and 4 - 5 times the yield of Jevons’ best results (Table 3-2,**

Figure 3-3). Hydroponic greenhouses yield 380,000 Kg/Ha. One year’s supply of fresh fruit and vegetables (for one person) could be grown using an average of only 4.2 m<sup>2</sup>) of greenhouse space (4.2 hectares for 10,000 people).

We should be aware however that this increased yield is usually gained at the expense of a far larger ecological footprint (Wada, 1993). The ecological footprint is a measure of the total amount of ecologically productive land required to grow the materials, and absorb the wastes generated. This is one way to compare the ecological sustainability of various operations. Therefore, hydroponic greenhouses are probably less sustainable than other practices (from an ecological perspective at least) unless they can be supported by waste products from the community such as the waste heat from buildings and passive solar gain. However, we should consider that even high-input hydroponic growing may be better than importing

our food from distant countries with warmer climates and the transportation related pollution and potentially poor growing practices this entails.

### **Comparing Growing Area Requirements of Different Methods**

**The average person consumes 160 Kg of vegetables per year.**

Figure 3-3 compares the area required to grow 160kg of four salad vegetables using different growing techniques. Obviously, people need more substantial food sources than these salad crops alone but these are the only crops for which there are reliable figures for hydroponic greenhouse production in British Columbia. Many other crops can be grown hydroponically, a technique that doesn't necessarily require greenhouses.

Examining these figures gives us some idea of how much food we could produce at Southeast False Creek. Most of the data is taken from actual production figures in British Columbia and therefore these results should be replicable at Southeast False Creek.

Using conventional techniques, 160kg of cucumbers, lettuce, sweet peppers and tomatoes would require 62.9Ha. of land. Using hydroponic greenhouse techniques, the same amount could be grown using 4.6Ha.

## **3.9 Food Miles, Energy Use and GHG Emissions**

Currently, the average person consumes the food items show in Table 3-1 above.

Typically this food travels 2000 km on average before it is purchased (Farm Folk, City Folk, 2000). The Pembina Institute has calculated the quantity of greenhouse gas (GHG) emissions that are produced as a result of food transportation and grocery shopping trips. In addition, the institute has calculated the amount of GHGs that are avoided if food is produced locally. If a person grows all the vegetables they need for a year they could avoid one of two weekly trips to the grocery store avoiding 312 kg of GHG emissions per year. In addition, the annual reduction of GHGs as a result of no longer having to transport 160 kg of food 2000km is 19.7kg per person. (Pembina Institute, [1]).

### **3.10 A Word on the Word “Organic”**

Organic agriculture, and variants known as restorative agriculture, regenerative agriculture, ecological agriculture or bio-dynamic gardening, is a production technique that emphasizes the maintenance of soil fertility and productivity without the use of synthetic chemical fertilizers and pesticides. Soil fertility is maintained and improved using techniques of composting, animal manures, mulching, crop rotation, biologically fixed nitrogen, and cover crops. Pests and disease are prevented using techniques such as biological pest control and beneficent plant pairings. Mulching is the use of natural materials such as straw, bark, paper, leaves that are placed on the soil and around the base of plants to provide a protective covering that prevents excessive moisture evaporation and leaching of soil nutrients by heavy rain. The



technique also prevents weeds and serves to add valuable organic matter to the soil, increasing its ability to retain water.

The *Organic Agricultural Products Certification Regulation* under the *Food Choice and Disclosure Act of British Columbia* empowers the Certified Organic Associations of British Columbia (COABC) to be responsible for accrediting certification agencies. In BC, strict guidelines for production operation and farm management exist. Only those farms certified by an approved certification agency (in this region British Columbia Association of Regenerative Agriculture -BCARA) are allowed to market and label their products as “organic” and attach the “BC Certified Organic” label.

Organic farming and gardening has flourished in British Columbia over the last 30 years. What was once a marginalized agriculture sector is now a bona fide industry with accompanying standards, inspections and professional associations. The premium received on organic produce, combined with a growing market for organic vegetables and fruit would suggest that organic production methods should be a key criteria in most urban agriculture applications. Organic food has become increasingly popular in recent years for several reasons:

- People are increasingly concerned about the health of food. Pesticides have been linked with major non-communicative diseases such as cancer and autoimmune deficiencies.
- Many people are scared of the potential health and environmental damage of Genetically-modified organisms (GMOs) but the Federal Government has so far refused to introduce labelling requirements. Because organic food is not allowed to contain any GMOs it has become the one sure way of avoiding GMOs in the diet.
- Organic agriculture aims to build the fertility of soil and to develop healthy ecosystems. Organic agriculture also has an ethical dimension in the treatment of animals. Those who share in these ideals are more likely to purchase organic food.
- The cost of organic food has dropped and organic produce is available in many mainstream stores nowadays.

The City of Vancouver has the opportunity to encourage and even require organic agriculture practices especially on land it chooses to lease to others. The Parks Board already bans pesticides from the community gardens it leases out and it would be a small step to ban artificial fertiliser as well.

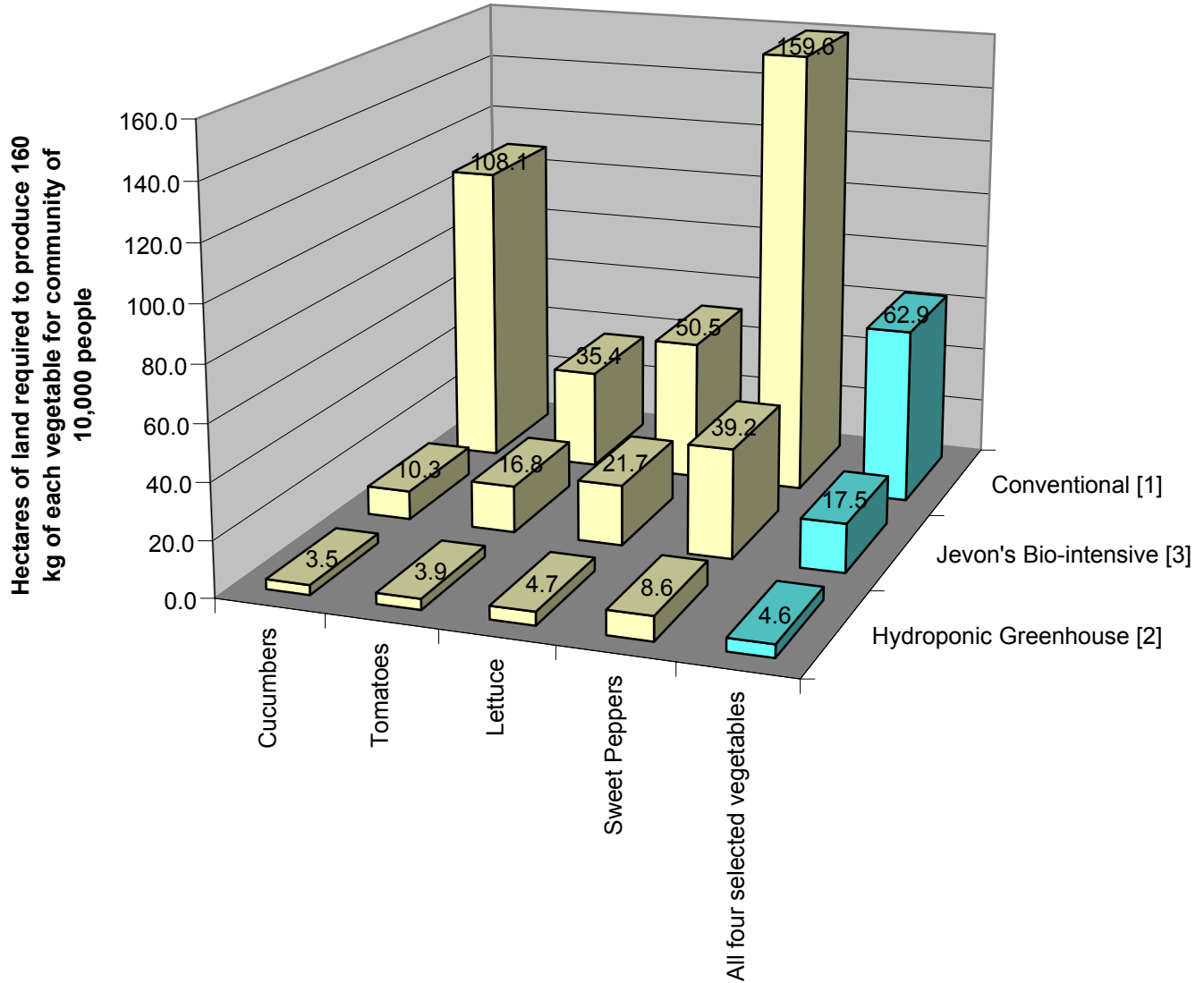
Some Canadian municipalities have recently banned the use of all cosmetic pesticides and the right to do so was recently upheld by the Supreme Court of Canada. Therefore, it would seem that the City has the right and may want to consider banning the use of all pesticides in SEFC with a small exception clause if pressing need can be demonstrated (infestation for example).

One complicating factor about the term “organic” is that in BC, hydroponic greenhouses cannot be considered truly “organic” and become certified even if they use no artificial chemicals or pesticides. This is because the local certifying agency takes the view that the term “organic” should be reserved for soil-based agricultural approaches because one of the primary purposes of organic farming is to build healthy soil. Other jurisdictions (California for example) take a broader view of the term. This is important because certified organic food can fetch higher prices and therefore make smaller scale operations more economically viable.

Method	Yield (av. annual) lb.'s/acre	Yield (av. annual) lb.'s/100 sq ft.	Area (sq.ft.) required to produce 350lb.'s (160 Kg) selected vegetables	Area (acres) required to supply community of 10,000 people with 350lb.'s (160kg) of selected vegetables
<b>Conventional [1]</b>				
Cucumbers	13,110	30	1163	267.0
Tomatoes	40,000	92	381	87.5
Lettuce	28,090	64	543	124.6
Sweet Peppers	8,879	20	1718	394.2
<i>All four selected vegetables</i>	<i>22,520</i>	<i>52</i>	<i>677</i>	<i>155.4</i>
<b>Hydroponic Greenhouse [2]</b>				
Cucumbers	406,000	932	37.6	8.6
Tomatoes	364,000	835	41.9	9.6
Lettuce	300,000	688	50.8	11.7
Sweet Peppers	164,000	376	93.0	21.3
<i>All four selected vegetables</i>	<i>308,500</i>	<i>708</i>	<i>49.4</i>	<i>11.3</i>
<b>Jevon's Bio-intensive [3]</b>				
Cucumbers	137706	316	111	25.4
Tomatoes	84541	194	180	41.4
Lettuce	65367	150	233	53.5
Sweet Peppers	36170	83	422	96.8
<i>All four selected vegetables</i>	<i>80,946</i>	<i>186</i>	<i>188</i>	<i>43.2</i>
[1] - Figures from BC Ministry of Agriculture, Fisheries and Foods, 1992. <i>Horticultural Statistics</i>				
[2] - As above				
[3] - Based on Figures of average gardener compiled by Jevons J. 1992. <i>How to Grow More Vegetables Than You Ever Thought Possible, On Less Land Than You Can Imagine</i>				

Table 3-2: Yields and land requirements using different growing methods (adapted from Barrs, 1998)

Figure 3-3: Comparison of yields from different growing methods (adapted from Barrs, 1998).



## **4.0 Strategic Objectives for Urban Agriculture**

The ultimate goal of the Urban Agriculture Strategy is to play a role in the overall planning, design and management strategy to increase the sustainability performance of SEFC as a high-density urban neighbourhood. Through brainstorming, research and consultation with stakeholders we developed a framework of strategic objectives for SEFC with respect to food and agriculture including:

1. Increase the physical capacity of the SEFC neighbourhood to support the growing of food;
2. Increase the amount of food grown in SEFC, privately and commercially;
3. Increase the amount of food consumed in SEFC that is produced both organically and as close to SEFC as possible;
4. Increase the food-related economic development initiatives, including increasing the local processing of food consumed in SEFC.
5. Increase the capacity of SEFC to provide or support basic food security initiatives for local Vancouver residents in need;
6. Encourage urban agriculture practices as a strategic approach to managing waste flows in a more sustainable manner;
7. Increase the technical capacity, skills and knowledge of all stakeholders especially relating to novel urban agricultural systems;
8. Encourage avenues to celebrate food and a community-based food system.

A ninth objective that is related to food and sustainability but has less relevance for an ODP process is:

9. Encourage food that is produced in other regions or countries and consumed in SEFC to be food produced through ethical and environmentally sustainable business practices.

These objectives are revisited at the end of the report when we discuss the various strategies used to achieve each objective.

## 4.1 Objective #1: Maximize the physical capacity of the SEFC neighbourhood to support the growing of food, in a manner appropriate to the development context.

### Description

The sustainability performance of SEFC with respect to its flow of food will largely be determined by how much and what type of food is produced and consumed in SEFC. It will be the corporate and personal choices of SEFC residents and businesses that will ultimately determine that activity and its level of performance. However little food can be produced in SEFC unless the design of the neighbourhood can physically support such activity. As such, the first Objective for SEFC should be, within the reasonable constraints of the market and regulatory constraints, to maximize the physical capacity of the SEFC neighbourhood to support the growing of food that can be consumed within the neighbourhood.

This objective is one of the most important for the ODP as the responsibility for meeting this objective lies largely with the primary stakeholders in the ODP process including the City, landowners, and developers. These stakeholders are the ones responsible for the planning, design and construction of SEFC and therefore will be responsible for ensuring the built and open spaces in SEFC can support the production of food.

Once the physical infrastructure or areas is in place and designed to support food production, then the opportunities to produce are assured and individuals or companies in SEFC may capitalize on them as they see fit. The next objective then becomes one of making sure the use of these areas or facilities is optimized.

### Strategic actions and policies to meet this objective may include:

- Create *public community gardens* in the Parks, public open space (including some boulevards in street rights-of-way) and school grounds in SEFC;
- Design private (backyard) and semi-private (strata) gardens at grade for maximum pervious area;
- Develop the *podiums and rooftops* of buildings (especially concrete buildings) in such a way as to support greenhouses and/or rooftop gardens capable of supporting the growing of food;
- Provide *balconies* for as many units as possible, especially on the east, south and west face of buildings; and
- Create food gardens for students and their families on *school grounds*;
- Provide regulatory support and program *internal areas of buildings* to support a range of appropriate food production facilities, including: agricultural technology or facilities, aquaculture systems and bioponics.
- Ensure adequate solar access for all growing areas and ensure soil is deep, free from contamination and of a high quality for agriculture.
- Set aside areas of City land (and/or rooftop space) that could be used for urban agriculture demonstration projects including aquaculture/bioponics, small-scale specialty commercial greenhouses, and/or an eco-industrial food complex.

## 4.2 Objective #2: Optimize the amount of food grown in SEFC, both privately and commercially.

### Description

The performance of the food dimension of SEFC with respect to sustainability objectives will be largely determined by how much of the food that is consumed in SEFC is grown or produced on the site. Increasing the amount of food grown on site provides many benefits, including:

- Reducing the amount of food-related transportation and transportation related refrigeration necessary to supply SEFC residents – both in the number of food miles (and therefore the embodied energy) of food sold in SEFC and the number of grocery shopping trips made by residents;
- Increasing the freshness of local food;
- Creating opportunities for the use of composted wastes produced within the community;
- Providing modest opportunities for less formal local economic activity;
- Increasing residents knowledge and understanding of where their food comes from; and
- Increasing the potential for SEFC residents to engage each other and build relationships.

Unlike the primary issue of the first objective, that of providing physical infrastructure for food production, the strategy to achieve this objective (#2) is primarily one of social activity and management.

### Strategic actions or policies to meet this objective may include:

- Establish accountable local organizations to manage public community gardens to ensure they are developed and maintained in a fashion appropriate to a highly used public space;
- Work with school administrators to encourage the development and use of gardens on school grounds and the integration of these spaces into the educational activities in the school;
- Provide information and support to strata councils and other building groups or companies to encourage the growing of food in private (or semi-private) gardens, balconies, rooftop gardens or greenhouses;
- Support the establishment of small companies or other organizations that can effectively and appropriately use interior spaces of buildings, parkades or rooftops to grow food for profit through a variety of means, including aquaculture, bioponics or through other agricultural technology (some of these techniques should begin as demonstration projects and if found to be successful expanded to other areas/buildings);
- Develop information resources and guidelines for the Parks Board, City staff and building owners and managers to use when designing or managing landscape areas to support the use of edible landscaping principles;
- Use edible landscaping strategies when selecting plants for the landscape plans of development parcels, parks and open space areas.
- Develop management policies for Farmers Markets located in SEFC to encourage the identification for shoppers what food for sale has been grown in SEFC;
- Consider encouraging commercial food processing facilities or restaurants in SEFC to grow or purchase food, herbs or other agricultural products grown in SEFC;
- Encourage companies in SEFC to establish eco-industrial network (EIN) relationships and look for opportunities to use food production to address the supply of materials or

- management of waste flows (i.e. compost organic wastes from one company and use the resulting soil to grow flowers for the tables of a nearby restaurant);
- Encourage local grocery stores to consider selling locally grown produce.

### **4.3 Objective #3: Increase the amount of food consumed in SEFC that is produced both organically and as close to SEFC as possible**

#### **Description**

This objective has two aspects. First, it involves increasing the amount of food consumed within the community that is produced as near the community as possible (i.e. in the Lower Mainland or in BC). Many initiatives have been identified in larger public policy discussions to support this objective, including Community Supported Agriculture (CSA), municipal procurement arrangements, and Buy Local campaigns. These are not discussed in this report as it is focused on SEFC, however they are worth noting. Other initiatives such as farmers markets are discussed as they have specific implications for an ODP.

This objective has the benefits of:

- Reducing the amount of food-related transportation (food miles) involved in food distribution and therefore reducing greenhouse gas emissions, and improving air quality;
- Encouraging the viability of local farms and assisting with the viability of the regional economy;
- Making food production more transparent – food is produced according to standards set within the region, province or country.
- Farmers markets are also a visible, vibrant addition to the community and a clear demonstration of the community's commitment to sustainable agriculture.

The second dimension is the focus on “organic” food, as it has been widely identified as having less negative impact on the environment and on human health. Organic food offers many widely recognized benefits include:

- Increased quality of taste and improved micro-nutrient content;
- Reduced harm to food handlers and those who eat the food by reducing their exposure to pesticides and other agricultural chemicals; and
- Eliminating the release of toxins into the soil, water and air where the food is produced.

#### **Strategic actions or policies to meet this objective may include:**

- Encourage the establishment of a permanent farmers market at SEFC that focuses on locally grown, organic food and is situated near to the SkyTrain station.
- Promote the benefits of locally produced organic food, possibly undertaken in conjunction with the Vancouver Richmond Health Board or other agencies;
- Encourage school curricula writers to explore issues surrounding the production of locally produced organic food; and
- Provide information to SEFC residents and businesses on the benefits and best management practices for growing organic produce.

#### **4.4 Objective #4: Increase food-related economic development initiatives, including those related to the local processing of food consumed in SEFC**

##### **Description**

Many food-processing companies that will provide the food SEFC residents will consume have moved to other regions and countries. By growing and processing foods in or around SEFC, transportation-related impacts can be minimized and local employment or business opportunities can be increased. Local food processors fit well into many cycles of eco-industrial networking and as such, these businesses can support innovative waste management systems.

##### **Strategic actions or policies to meet this objective may include:**

- Plan, zone and design buildings in the area for commercial food related activities (grocery stores, aquaculture, bioponics, food processing facilities, incubator or educational facilities, and emergency food service infrastructure); and
- Provide incentives to encourage small food processing companies to locate in SEFC where appropriate.

#### **4.5 Objective #5: Increase the capacity of SEFC to provide or support basic food security initiatives for local Vancouver residents in need**

##### **Description**

This objective involves addressing opportunities to provide inexpensive access to food for everyone in SEFC (especially low income people), in order to provide what they need for healthy or cultural appropriate diets. In addition to some of the above strategies that encourage food production and processing for personal consumption, this strategy includes the recognition of the issue of simple physical access to cost-effective food stores, such as locating grocery stores and farmers markets where they are accessible by transit, and providing for emergency Food Box Delivery. Systems run by non-profit groups that focus on food affordability and choice, and Emergency Food Services such as food banks and meal programs should be considered and encouraged where appropriate in SEFC.

##### **Strategic actions or policies to meet this objective may include:**

- Provide subsidized space and training for low income residents in SEFC's public community gardens;
- Encourage donations of some food produced in at SEFC to Food Banks or other organizations and/or to emergency food relief;
- Encourage the use of *edible landscaping* principles in all public areas.
- Encourage local producers/processors to train and hire low-income people.



## **4.6 Objective #6: Encourage urban agriculture practices as a strategic approach to managing waste flows in a more sustainable manner**

### **Description**

One of the opportunities presented by urban agriculture is the ability to turn waste flows into valuable products and to reduce transportation required for waste products. Urban agriculture offer many opportunities including the re-use of composted food and garden wastes, waste heat from buildings, rainwater captured from rooftops, possibly grey-water for irrigation, and even food wastes for feeding fish. These strategies can often assist a neighbourhood in increasing its sustainability performance on many fronts simultaneously.

### **Strategic actions or policies to meet this objective may include:**

- Provide information and assistance to groups overseeing the management of public community gardens or school gardens regarding composting of landscape litter and other organic wastes and their re-use in the garden areas;
- Promote the composting facilities in private backyards, rooftop gardens or greenhouses;
- Utilize heat pumps to move excess heat from interior spaces of buildings to greenhouses, where this approach is cost-effective;
- Develop aquaculture and/or bioponic facilities to utilize organic waste flows from the neighbourhood as food or nutrient streams for economic gains; and
- Promote the establishment of an eco-industrial complex or eco-industrial networking relationships between businesses in SEFC.

## **4.7 Objective #7: Increase the technical capacity, skills and knowledge of all stakeholders especially relating to novel urban agricultural systems.**

### **Description**

Achieving the maximum benefits from urban agriculture at SEFC will require increasing the technical capacity of growers (both volunteer and commercial) to produce high yields of nutritious food from small spaces. Some techniques for urban agriculture such as aquaculture and bioponics, small-scale commercial greenhouses and eco-industrial food complexes are rare or untried in a high density urban environment and present a number of challenges that make them inappropriate for widespread adoption at this time.

### **Strategic actions or policies to meet this objective may include:**

- Retain the control of some land at SEFC (at least for a few years) and either:

- Invest directly in demonstration projects to demonstrate the feasibility of novel technologies such as tank-based aquaculture/biaponics and/or a small-scale urban commercial greenhouse operated organically and retailing directly to the public; and/or
- Request proposals from urban agriculture entrepreneurs/NGOs to establish novel demonstration projects with multiple benefits and develop detailed agreements that ensure the projects are conducted according to established City goals.
- Partner with academic institutions and NGOs to develop a food incubator that trains and provides support for food entrepreneurs.
- Hire an urban agriculture expert/animateur that would provide advice, training, co-ordination and research support to gardeners and small-scale commercial operators.

## **4.8 Objective # 8: Encourage the public celebration of local food.**

### **Description**

Part of a successful strategy will be to build interest and momentum around food issues, and celebrate the successes of the community. This will reinforce the difference that the community is making and encourage others to participate.

### **Strategic actions or policies to meet this objective may include:**

- The City should allow food-related events to take place at the local neighbourhood centre
- Encourage the establishment of outdoor farmers markets that in themselves are colourful, interesting celebrations of local food and farmers.

*Related but less relevant for the ODP process is:*

## **4.9 Objective #9: Encourage food that is produced in other regions or countries and consumed in SEFC to be food produced through ethical and environmentally sustainable business practices**

### **Description**

This objective is based on a recognition that much of the food consumed in SEFC will be produced in other regions or countries, and that agricultural practices in those regions may be undermining community or environmental health in those regions. Implementing this objective involves addressing the relationships SEFC residents and businesses have with farmers and producers in more distant regions in a manner that can encourage and support sustainable and equitable farming practices. This approach may include Fair Trade campaigns, purchasing agreements, boycotts of certain products.

Apart from supporting the provision of credible information on this matter and the education of residents and businesses, there is a minimal role for the City in this strategy, and little or no implications to the ODP. However as the recommendations of this strategy extend past the ODP, the City may want to encourage those who may be charged with overseeing sustainability issues in SEFC in one form or another to address this issue in some manner, as it has many points of relevance to “sustainability.”

**Strategic actions or policies to meet this objective may include:**

The City could encourage NGOs and others to distribute information and develop food distribution systems that have an ethical angle to their purchasing.

**The following sections consider specific food production, food processing and food distribution options in detail that might support one or more of the above-noted strategic objectives.**

## 5.0 Implementation Tools and Responsibilities

### 5.1 Implementation Roles and Responsibilities

Many of the options discussed require action on the part of both the City and other stakeholders. In the case of a community garden for example, the other stakeholders would be a community garden association and the individual gardeners. In the case of a school garden, the school board and the school principal would need to support any idea for food production on school land. Some of the options require action on the part of developers and others require the participation of food and gardening advocates like Farm Folk City Folk or City Farmer for example.

The major stakeholders who will influence urban agriculture are:

- The City of Vancouver – Planning Department, Social Planning, Engineering, who develop the plans, zoning bylaws, engineering standards and social programs;
- City health departments administers the Public Health Bylaw;
- Vancouver Parks Board controls park space and park programming;
- Vancouver School Board is responsible for school landscape management and programming;
- Private Developers and their consultants are responsible for designing, and building private buildings;
- Strata-councils will be responsible for managing privately-owned buildings;
- Non-governmental organizations (NGOs) with interest in food and agriculture can assist with the implementation of demonstration projects, food security projects and developing educational materials;
- Academic institutions might do research into new urban agricultural technologies and approaches;
- Urban Commercial Growers, Processors and Distributors will be responsible for growing, processing and distributing food.

### 5.2 Implementation Tools

The City has, at its disposal, a variety of governance tools that can be used to influence and control where, how and how much urban agriculture is practised. These tools of governance include policies, regulatory tools, incentives for developers and entrepreneurs, education and public programming, public investment, and partnerships.

**Policies** are broad statements of intent – they serve to outline the intention of the City and provide clarity for all stakeholders.

**Regulatory tools** force stakeholders to adopt prescribed standards. Tools in this category include:

- Land designations and how these designations are distributed. Lands designated for urban agriculture for example might allow only agricultural uses.
- Zoning that allows only certain uses to occur within prescribed areas (inclusive zoning) or prohibits certain uses (exclusive zoning) and defines standards for each zone;
- Design guidelines for buildings and landscapes that prescribe certain design features or standards expected of developers. Design guidelines may apply citywide or be tailored to a specific zone or building.

- In some cases, existing regulatory tools may inhibit urban agriculture and the City could work with internal staff and other agencies to negotiate regulatory review and/or flexibility in interpretation.

**Incentives** encourage rather than require stakeholders to adopt certain practices by making it easier or cheaper to develop in a certain way. Incentives include:

- Economic incentives such as reduced fees or taxes; and
- Non-economic incentives such as streamlined approvals.

**Investment** governs behaviour by making certain projects happen (City as entrepreneur) or by making development or other commercial or non-commercial ventures easier to do in certain areas than others. This might include:

- investment in irrigation infrastructure in a certain part of the site that makes irrigation easier and cheaper for gardeners
- provision of composting facilities
- investing in demonstration projects that demonstrate the feasibility of novel technologies or approaches that are untried in local circumstances.

**Educational initiatives** and **public programs** run by the City assist with the implementation of urban agriculture by increasing the capacity of growers, processors and others related to the food system and by building public support for initiatives.

**Partnerships** – many urban agriculture initiatives require the co-operation and support of other stakeholders

These different tools can be used either individually or in combination. Some are more appropriate for private development sites and others more suitable for public land and buildings. Which tools are used, in what combination and under which circumstances has been the subject of phase 2 of this study and for each of the options presented in the report we discussed how each implementation tool might apply. In addition, Table 9-1 summarizes this discussion.

There are three distinct roles for the City:

1. City as regulator;
2. City as investor/entrepreneur/promoter; and
3. City as program facilitator/manager.

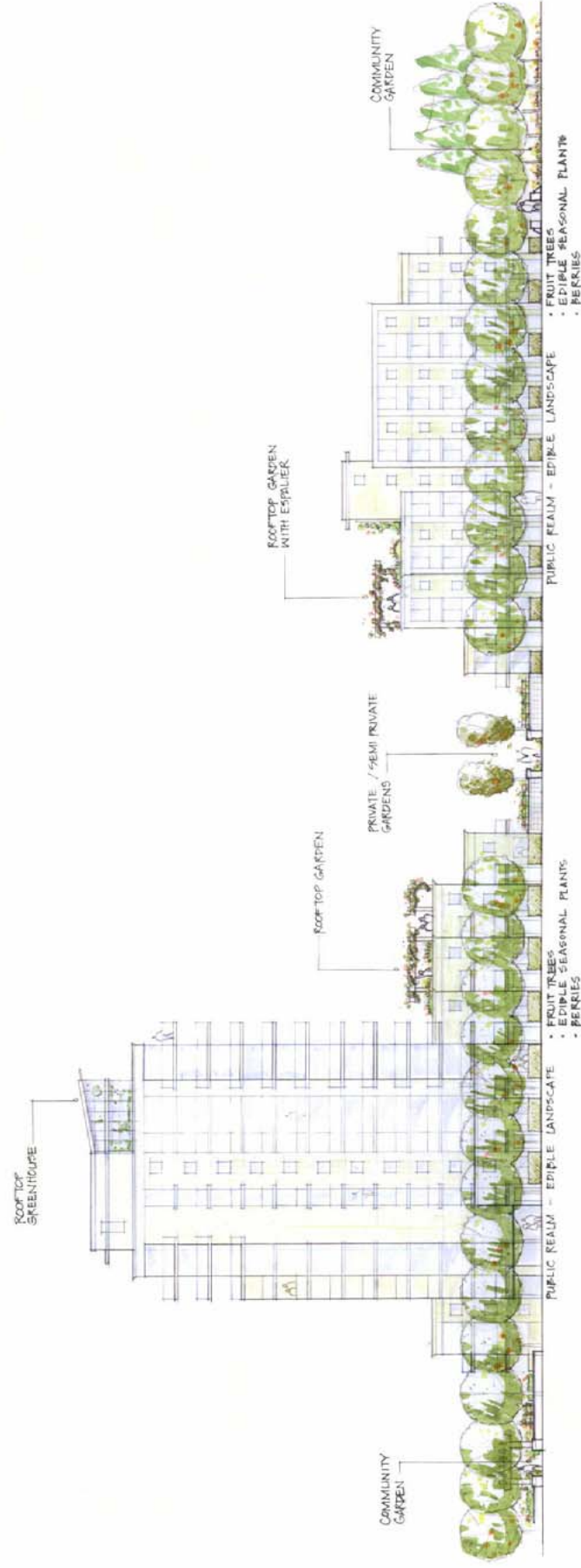
## **6.0 Food Production Options**

As previously noted, there are many different ways to achieve the objectives for food related activity at SEFC. Some of these require the City to play a large role in land use allocations, while others are more appropriately addressed through the support of other stakeholders. The following food production options are presented as an overview of the possibilities and to generate further discussion regarding the relative merits of each and how each might most effectively be implemented. The following options are considered in this section of the report:

1. Public Community gardens
2. Private (Backyard) and Semi-private Gardens at Grade
3. Rooftop Gardens
4. Balconies, Window Boxes
5. Edible Landscaping of the Public and Semi-private Realm
6. Commercial Greenhouses
7. Commercial Market Gardens
8. Inside Buildings
9. School Gardens
10. Aquaculture & Bioponics
11. Micro-livestock

Some of these options are illustrated in Figure 6-1 which shows an elevation of a typical streetscape at Southeast False Creek and how urban agriculture might be integrated into the landscape and building design.

**Figure 6-1: Urban Agriculture Production Options (overleaf)**



## URBAN AGRICULTURE - PRODUCTION OPTIONS

SOUTH EAST FALSE CREEK

## 6.1 Option G1 – Public Community Gardens

### Description

Community gardens 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. Existing community gardens in the GVRD range in size from 0.1 acre (McSpadden) to 3 acres (Strathcona).

As of 1997, the City of Vancouver had 580 community garden plots and Greater Vancouver has a total of about 2000 plots in 21 operating community gardens (Connolly, 1997). Other cities provide for a greater involvement in community gardens - Berlin, for example, has more than 80,000 gardeners who lease plots on land where buildings were destroyed in World War II (Nelson, 1996). Metropolitan Montreal has 6,278 garden plots which are attended by some 10,000 residents, 1.5% of the city's adult population (Ville de Montreal, 1994). The success of the Montreal example seems to stem partly from the fact that the municipality hires three *animateurs* whose job is to actively promote community gardening and provide advice, education and site identification. Montreal has a zoning designation for community gardens which gives a much-needed sense of security to those involved in this activity (TFPC, 1997). In New York a municipal agency called "Green Thumb" makes more than 1000 vacant lots available to community groups and urban gardeners (Smit et al. 1996).

### Benefits

Community gardening has proved to be a viable approach to food growing in Vancouver. Many people supplement their diets with nutritious, fresh produce as well as save money on grocery bills. In addition, community gardening provides an opportunity for healthy, outdoor recreation in a social setting. Many community gardeners develop friendships because 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 with gardeners and non-gardeners alike. Community gardens offer the unique opportunity for citizens to experience, through vicarious and actual means, links to our agrarian past. Often seniors, who have spent some of their life 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 significant economic benefits that result through the 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 those of controls the study also showed that urban gardeners find life marginally more satisfying than non-gardeners (Blair et al, 1991).



Moura Quayle and Tilo Driessen suggest:

'In the neighbourhood, tinkering, gardening and fixing up, if seen from the public street, are activities that draw comments, sometimes unwanted advice, helpful hints or nosy questions. People feel encouraged to talk to each other when there is something obvious to talk about... Words of support make the person doing the work feel valued as a part of a social group; their role as an appreciated member of the community is affirmed' (Quayle & Driessen, 1997).

Another interesting benefit of community gardens can result from gardeners sharing heritage varieties of crops that would otherwise be lost. This can be done either informally or formally through establishment of a heritage seed bank. There are a number of existing North American organizations that specialize in heritage seeds. Some rely on member participation to save and share seeds with other gardeners. Industrial agriculture and commercial seed production has gradually reduced the number of crops varieties commonly grown. This has depleted the overall genetic stock. Saving and sharing seeds with others is one way to reverse this decline in biodiversity.

### **Type and Size of Space Required**

Opportunities to devote significant areas of land to community gardens are limited in SEFC. The 26 acre park is the largest contiguous open space within SEFC and as such it is the obvious area in which community gardens could be integrated. Demands for programmed and non-programmed recreation uses, passive recreation and habitat enhancement would have to be weighed against the benefits of community gardens. However, smaller parcels of land within SEFC may be set aside by the City for community gardens, including lands temporarily excluded from residential development, street ends and/or unopened rights of way could be leased to a community garden association on a permanent or temporary basis.

	<b>Description</b>	<b>Examples</b>
Type of Space Required	Ground level, public open space	Parkland Schoolyard Community centre landscape Street ends Vacant city land
Size of Space Required	Minimum area required: 500 square metres	

### **How much food could be grown?**

In Philadelphia researchers found that “the mean [annual] economic value of the 151 assessed garden plots was \$160 with a range of \$2 to \$1134. This is similar to the median yield value of \$101 to \$250 for community vegetable production reported by the National Gardening Association survey of community gardens. 49.7% of the Philadelphia urban garden plots yielded produce worth less than \$100, 29.2% had a yield worth between \$101 and \$250, 15.1% yielded between \$251 and \$500, and 6% yielded produce worth greater than \$500.” (Blair et al., 1991). The Philadelphia research indicates that the economic benefits to individuals practising community gardening are potentially significant but that urban gardening does not usually make a major contribution to family incomes.

Taking the most conservative estimate of average yields of community/backyard gardening of 26,000kg/Ha., if 0.5 ha. of community gardens were located in SEFC they could potentially generate about 1 % of the community's vegetable and soft fruit requirements. If the most optimistic estimate of potential yields are applied, then the same amount of land could generate almost 5 % of vegetable requirements for future residents of SEFC.

## Challenges

Lack of significant contiguous open spaces in a high density neighbourhood such as that planned for SEFC will pose obstacle to community gardens. Most community gardens in Vancouver are located on vacant, underused land or in parks. Once development approvals are granted at SEFC, land is unlikely to remain vacant for very long. In addition, the 26 acre park at SEFC will experience high demand from other uses. At this time the community development and social potential of community gardens has yet to be embraced by the Park Board. As a result, one of the challenges will be to design the park in such a way that community garden lots have a distinctly public face. At a minimum, a community garden demonstration project should be an integral component of the park program that is layered with both active and passive recreation. For example, heritage apples and other edible landscaping may be planted that have educational, aesthetic and food values

Although gardening at some level is fairly simple, producing high yields and consistent quality is a challenge for many gardeners. As the Philadelphia researchers have shown, there is typically a wide range of yields from community gardens. Increasing the skill level and productivity of some gardeners requires training and information.

Community gardens sometimes suffer from theft and vandalism, which can deter some gardeners. However, most of the community gardeners in Vancouver seem undeterred by this annoyance.

The perception of urban agriculture is that it is messy and in the case of fruiting trees, they can cause a slip and/or insect concern. Although this perception is the product of minimizing risk in the public landscape, it needs to be resolved if community gardens are to occur at or near travelled portions of walkways or roads.

Rodents (mice and rats) could become a nuisance if compost bins associated with community gardens (or other options) are not properly designed and managed. Rodents are generally not attracted to food plants or garden waste. They are however, attracted to kitchen wastes of all kinds and can be very persistent once established. This problem is further exacerbated by the shoreline location of SEFC, a preferred habitat of many rodent species.

## Cost

Community gardens are an inexpensive landscape treatment in that very little other than rich deep soil, irrigation, some interpretive signage and composters are required.

Based on providing topsoil, irrigation, perimeter boards and signage, and miscellaneous items for an area 20 m x 50 m; 1 metre deep soil throughout; 1100 feet of perimeter boards the estimated cost per square metre is \$49.00 not including site premiums that could arise due to drainage, contaminated/compacted soils etc.

## Evaluation

	Advantages	Disadvantages
Social	Builds community; fosters interaction; animates the public realm; creates year round interest; creates learning opportunities; supplements vegetable needs by 1 – 5%; creates passive recreation opportunities; opportunity for all residents to participate	Urban dwellers will need training; the contrast of rough and refined may not be accepted; consumes land in relatively large landscape increments; can be perceived as a private use; vandalism potential; additional landscape management/administration load
Environmental	utilizes solid waste by products; enhances the aesthetic diversity and experience; creates a “working” landscape; enhances total pervious surface; provides an additional reason for residents to recreate near home; enhances bio-diversity; providing organic methods are used, there is no impact on groundwater; can utilize harvested stormwater. May increase genetic diversity of seed stock if heritage varieties are grown.	Habitat enhancement capacity is high, but not as high as other landscape types; will impact park design; rat habitat must be managed; irrigation water demand will increase in summer
Economic	Can marginally reduce food costs; could be an “incubator” site for small scale urban food production; very economical landscape construction costs	Consumes land in relatively large landscape increments; does not provide a multiplier effect; does not create jobs;
Other	Readily transferable Urban Agriculture Strategy. Can be converted to other land uses very easily. Tried and tested approach to urban agriculture.	Not an innovative strategy – has been proven elsewhere.

## Implementation

### Land Use, Site Layout

- The integrated structure plan and the park planning processes will provide opportunities to include community gardens. The site layouts should integrate community gardens with the stormwater and waste management objectives.
- The location of the community gardens should enable easy (pedestrian or bicycle) access to the nearest community garden by anyone in the community.
- The park design and public realm design processes should address the applicable advantages and disadvantages of community gardens, addressed above.
- Once the general boundaries of the space have been established, it should be left up to the community garden association to propose a design and overall layout. However, a set of design principles (to meet sustainability objectives) assistance and perhaps informal design review will help to ensure that sustainability objectives are met.

- If located on City-owned land, the City could develop its own standards for maintenance and management of community gardens and include these with any lease agreement negotiated with the association that manages the garden.
- Design and management guidelines for community gardens would enhance both the design process and the long-term efficacy of community gardens. They would also help to satisfy the Park Board's needs for greater confidence around the use and administration of the community garden spaces.

## Design

- Composting facilities associated with community gardens must be designed to be as rodent resistant as possible. Plastic bins are somewhat resistant although rats can chew through plastic in some cases. Better is 0.5 inch wire mesh fully enclosing the composting unit. This requirement could be part of any lease agreement with a community garden association.
- Alternatively, a centralized in-vessel composting facility will resolve the rodent problem so long as all residents make use of this facility to compost kitchen waste.
- Any rodent problem should be dealt with swiftly because it can rapidly become difficult to control once large populations are established.
- The Park design should allow for flexible space that can go into and out of food production as demand fluctuates.
- Community gardens be allowed and encouraged in some of the SEFC right-of-ways recognizing that this approach is dependent on the width of the ROW and boulevard, on the adjacent land uses, and on the quantity of traffic in the neighbourhood.

## City Investment

- Community Gardens offer several partnership investment opportunities that would significantly reduce capital and maintenance costs to the City and the Park Board. Community gardens require investment of a small amount of resources by the City in terms of staff to develop policy, monitoring/regulate the activity of the association and draft and negotiate agreements. A community garden association can raise most, if not all money for tools, seeds, plants, clubhouses, greenhouses etc. although the City may decide to assist financially with these aspects.
- In addition, the hiring of an animateur (see programming below) will require public funds.

## Programming and Education

SEFC has been identified as the City's community development sustainability model. As with all new endeavours the planning and delivery may be somewhat ahead of its time. Programming and educational tools are available that will assist new residents, visitors and others interested in urban agriculture in SEFC to better understand and endorse the principles included in this strategy, including the community gardens option.

- In keeping with the Park Board's community gardens policy,<sup>14</sup> potential public lands in SEFC should be identified for community gardens.

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<sup>14</sup>On April 15th, 1996 The Vancouver Board of Park's & Recreation unanimously approved a community gardens policy. The policy commits the Board to helping groups find resource information on gardens, locate suitable sites in the city (which may be in public parks), develop user agreements with the owners of the selected site and develop a community environmental education program.

- Community gardens be established in the Park with emphasis on collectively managed community gardens rather than individual plots but if there is a large demand for space to grow food in the new community then some of the park space should be used for allotment gardens (privately managed plots).
- The model of allowing non-profit associations to manage community gardens has worked well in Greater Vancouver and this approach should be a keystone of the implementation program.
- If income patching is considered an important component of supporting low income families, then the City could explore allowing the products from community gardens to be sold at farmers markets and through food-box schemes (see distribution options).
- As the Strathcona Community Garden Association has demonstrated, community gardens can be a venue for exploring sustainable design well beyond that of gardening. The City should consider whether it will allow initiatives such as a shelter/clubhouse/toilet in the community gardens and if so whether such a structure could be design and constructed using high performance building approaches.
- We recommend the development and adoption of a community gardens policy for the City as a whole to clarify the level of support for the establishment of community gardens on private and city-owned land.
- The city should explore the possibility of engaging the services of an horticultural advisor (based on the Montreal idea of the animateur) to promote community gardening (and other forms of urban agriculture) in the SEFC community and beyond. This person could provide technical advice, assist with the design, liase with land-owners, draw up lease agreements etc. and assist City landscape review staff to encourage and require the appropriate design standards for new semi-private landscapes. Alternatively, the City could train existing landscape review staff in horticulture and urban agriculture.
- Emphasis be placed on organic methods of production. There is no reason why pesticides should be used on a regular basis, and if an adequate supply of compost is available supplemented with small quantities of organic fertiliser then no chemical inputs need to be used. This should be included in lease agreements with the association managing the gardens.
- School Boards be encouraged to develop public community gardens as part of their school greening and to incorporate food growing into the curriculum (also see Option G9).

## Case Studies and Precedents

Click on hyperlink or see Appendix B

[Strathcona Community Gardens](#)

[West Vancouver Community Gardens](#)

## **6.2 Option G2 – Private (Backyard) and Semi-Private Gardens At-Grade**

### **Description**

The term “backyard gardens” usually refer to the gardens associated with single-family residences. However, all housing at SEFC will be multi-family. Therefore, we extend the term “backyard gardens” to the semi-private landscape around multi-family buildings that is usually managed collectively by a strata council but may also contain small private landscaped areas associated with at-grade units.

At present, backyard gardens produce far more food in urban Vancouver than any other form of urban agriculture. There are numerous areas of the City (mainly single family zones) where backyard gardening is extremely popular and produces a large amount of useable food, especially soft fruit and vegetables. Backyard gardening is one of the fastest growing and most popular outdoor leisure activities in North America. A recent Ipsos Reid poll conducted for City Farmer revealed that over 40% of people in the GVRD live in households that produce some of their own food (City Farmer, 2002). It has touched a nerve with the baby boomer generation and shows no signs of diminishing in the near future. It has been successful partly because it is so immediately accessible for most home-owners and many tenants with access to the backyard. As well, it is an outdoor physical activity that also includes a component of planning and learning – all factors that attract the baby-boomer generation.

Strata landscapes are more rarely managed to grow food but also offer immense potential for private food production if managed properly for this purpose by strata councils. These landscapes could be managed either by members of the strata council or the strata council could hire a professional gardener to grow food.

### **Benefits**

Backyard gardens offer a significant potential educational benefit for understanding the productivity of soils in this climate and the process of growing food. As with community gardens, backyard gardens enhance the understanding of urban agriculture to children, casual visitors and those wishing to learn more about growing food in the city.

Another benefit of backyard gardens is the ease with which the land use can be relatively easily changed to another use.

Backyard gardens have the significant positive social and recreational impacts in the community. Whether gardened by the adjacent owners, or gardened by others the “over the garden fence” communication builds community knowledge and understanding of urban agriculture as well as provides venues for North America’s fastest growing outdoor recreation activity.

The impact of backyard gardens on other land uses and the affect on adjacent land values is quite limited.

Backyard gardening offers opportunities primarily for those living in single-family residences, in garden apartments or condominiums however, with sufficient community programming others who wish to grow in backyard gardens could use spaces that adjacent owners may choose not to use.

In terms of capital costs backyard gardens are one of the most affordable urban agriculture options. Relatively little infrastructure is required and soils that would traditionally have been installed for ornamental landscaping can be used for backyard gardens with little or no amendment, although greater depth and fertility is desirable. Consequently, potential recovery of initial investments is quite high.

Potential long term maintenance costs of backyard gardens to the public sector is relatively low, depending on the extent to which the backyard gardens expands on to public lands.

Potential long term maintenance costs for the private sector are commensurate with the amount of backyard gardens and the level of agricultural intensity.

### **Type and Size of Space Required**

In SEFC, all residential accommodation will be multi-family and therefore, private owner-controlled gardens (either backyard or front yard) are likely to be very limited and probably restricted to small patio gardens associated with ground level condominium suites and rental suites. These gardens could, however, be designed to integrate with the adjacent semi-public and/or semi-private spaces, thereby expanding their urban agriculture potential. If the adjacent landscape is planned in a flexible manner and strata-council policies instituted that would allow for the use of adjacent areas to be used for urban agriculture purposes, a fabric of private and semi-private gardens could emerge. Criteria with respect to the use of the public or semi-public space for urban agriculture would have to be developed so that the area would not just be annexed for private use, but utilized for the production of food.

Some residents with backyard gardens may choose not to grow vegetables or fruit and in those cases the areas could be tended by others with an interest and commitment to grow food in these otherwise under-utilized areas. The produce resulting from these efforts could be shared with the garden owner, utilized by the gardener or donated to a food bank.

High intensity, multiple crop gardening systems with deep beds of organically-enriched soil, good drainage and adequate solar access could make some of the backyard gardens in the SEFC neighbourhood very productive. And given the discrete, high profile areas involved, some of these gardens could be trial or demonstration gardens that would be used for testing certain varieties or gardening systems. The concept of an edible landscape, in the heart of an urban environment, is an opportunity that backyard gardeners could exploit.

The use of productive green walls, where crops such as ever-bearing strawberries, spinach and herbs could be grown, as well as vines trained up trellises, may pose a backyard gardening opportunity that would maximize solar gain and available space.

Private and semi-private gardens in SEFC could be very small. In fact, many backyard vegetable gardens in single-family areas are often no more than a few metres square. Although southern exposure is ideal, in this climate there is sufficient sunlight during the growing months even in north facing gardens to produce a surprising array and volume of vegetables.

	<b>Description</b>	<b>Examples</b>
Type of Space Required	Ground level, private/semi private/ semi public open space; maximum sunlight available	Front yard/ rear yard landscapes, patio and foundation plantings

Size of Space Required	Minimum area required: 5 square metres; horizontal configuration not as important as soil depth (min. .35 metre)	
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### How much food could be grown?

The yields obtained from backyard gardens vary tremendously as shown by the Philadelphia urban gardens report (Blair et al, 1991).

According to the draft structure plan, the private and semi-private opens space at grade will be total 7.9 Hectares. If we assume 1 hectare (12%) of this space will be dedicated to food production then taking the most conservative estimate of average yields of backyard gardening of 26,000kg/Ha., backyard gardens could potentially generate about 1.5 % of the community's vegetable requirements.<sup>15</sup>

If we took the most aggressive estimate of yields (suggested by Jevons), then the same amount of land would generate almost 10 % of vegetable requirements for 10,000 people.<sup>16</sup>

If small private greenhouses were to be built on some of this land, yields could be higher.

### Challenges

With SEFC designed primarily for condominiums and a smaller number of ground oriented homes, one of the primary constraints of backyard gardening is the small amount of space in the private and semi-private outdoor spaces available for urban agriculture. Given the lack of space and difficulty of access to these small spaces, the use of equipment for tilling is not practical. This will limit the productivity of the backyard gardens to those willing and able to dig the soil in spring and fall by hand and to carry plants, supplements and mulches from a vehicle or storage area.

Backyard gardens will also be limited to growing vegetables and vine fruits such as grapes and kiwis and in some gardens cane fruit like blackberries and raspberries.

One of the bio-physical challenges that all backyard gardeners contend with is the extent to which their growing area is shaded by adjacent buildings or trees. Some backyard gardens in SEFC may not have sufficient direct sunlight to be able to grow crops that require a minimum amount of direct solar exposure. In this climate, with the light intensity and duration received during the summer months, many vegetable crops will survive. The question is: will they be sufficiently vigorous to grow to maturity and not be weakened to the point where disease and insects hasten their demise or they simply do not produce as expected?

Anyone that has practised gardening in urban and suburban environments understands the trials of gardening where there are over populations of cats and dogs. Their presence, (or rather what they leave behind), can turn the most wonderful horticultural experience into a rather unpleasant encounter.

<sup>15</sup> 1Ha. x 26,500Kg./Ha. = 26,500Kg. 26,500Kg /1,600,000 Kg (annual consumption of vegetables for 10,000 people = 1.66%

<sup>16</sup> 1Ha. x 156,000 Kg./Ha. = 156,000Kg. 156,000Kg. /1,600,000 Kg (annual consumption of vegetables for 10,000 people = 9.75%



## Cost

Based on a garden area of 12 square metres with topsoil, irrigation and perimeter boards installed, estimated costs for this option: \$61.00 per square metre.

## Evaluation

	Advantages	Disadvantages
Social	Fosters interaction with neighbours; animates the semi-public realm; creates learning opportunities; supplies healthy, fresh food to grower; creates and active and passive recreational opportunities;	Urban dwellers will need training; the contrast of rough and refined may not be accepted;
Environmental	Creates year round interest; utilizes solid waste by-products; enhances the aesthetic diversity and experience; enhances total pervious surface; provides an additional reason for residents to recreate near home; enhances bio-diversity; providing organic methods are used, there is no impact on groundwater; can utilize harvested stormwater	Rat habitat must be managed; irrigation water demand will increase in summer
Economic	Can marginally reduce food costs; economical landscape construction costs;	Does not provide a multiplier effect; does not create jobs;
Other	Tried and tested approach to urban agriculture	Not innovative – few research or educational opportunities.

## Implementation

Compared to implementing other food production options, the implementation of backyard gardens as a viable component of a site wide urban agriculture system is straightforward.

### Land Use & Site Layout

- Locate buildings and building accesses to maximize solar access to backyard gardens
- Integrate the site open spaces so that backyard gardens could expand into public open space
- Provide small scale garden compost depots at frequent intervals in SEFC

### Design

- Detail backyard gardens for both privacy and food production
- Specify quality organic soils at a min. depth of 500 mm.
- Design walls to accommodate hanging vegetable gardens
- Provide adequate hose bibs
- Provide a community tool-shed for wheelbarrows, tools, hoses and space for fertilizers, soil supplements

- Provide places for vine fruits including arbours
- Provide frames against walls to facilitate espalier fruits (apples, pears, peaches etc)
- Plant backyard gardens with vegetables within 2 weeks of occupancy. Alternatively: provide a \$150.00 nursery allowance for vegetable plants
- Develop design guidelines that specify backyard vegetable garden requirements, offer precedent examples and provide edible landscape options.
- See Community Gardens Option for managing rodents.

### **Programming**

- The Park Board could run “new gardeners” classes each spring and fall as each phase of SEFC is built and occupied. This could be offered through the SEFC neighbourhood centre.
- Surplus garden produce programs to be developed with food banks or other agencies
- “Use MY Garden” bulletin board for those unable to tend their vegetable garden

### **Supporting Policy and Incentives**

- Encourage organic gardening practices by implementing a “no pesticides” policy in SEFC.
- If a new owner chooses not to have an ornamental landscape installed by the developer, they could be offered a “nursery voucher” for vegetable seeds, starts and plants instead.
- Create incentives for developers to maximize the percentage of landscaped open space and minimize the amount of hard surface paving in private and semi private landscapes to ensure long term urban agriculture potential.

### **Case Studies and Precedents**

Backyard gardening is so familiar that no case studies are really necessary. However, City Farmers compost demonstration garden serves as a useful example of techniques that can be employed successfully in most backyard situations.

## 6.3 Option G3 - Rooftop Gardens

### Description

Rooftop gardens (or agricultural green roofs) are green roofs 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 of the environmental concerns associated with buildings. Rooftop gardens represent one of the largest opportunities for urban food production at SEFC and therefore a workshop was organized that included green roof design and management experts. The intent of the workshop was to establish the differences between agricultural and non-agricultural green roofs and consider design requirements and implementation considerations. The information in this section reflects the ideas generated during that workshop. (See appendix C for workshop notes)

### Differences between green roofs and rooftop gardens

There are several differences between rooftop gardens and non-agricultural green roofs.

Standard, non-agricultural green roofs are generally designed for:

- Stormwater Management
- Improved Microclimate (reduced Urban Heat Island Effect)
- Wildlife Habitat for butterflies, birds, insects.
- Energy Efficiency
- Aesthetics (views from units above roof)
- LEED Credits

Whereas agricultural green roofs (rooftop gardens) are designed for:

- Food Production
- Active recreation
- Re-using wastes (compost, stormwater)
- Educational opportunities

Key design criteria for agricultural green roofs include:

- Deeper, more fertile agriculturally-rich soil is required, free from contamination
- Ability to withstand greater structural loads (both soil and people)
- Wind protection (to protect fragile food plants from the elements)
- Storage shed for tools, equipment, plants (temporary); hand and boot wash
- Irrigation equipment (hose bibs, hoses, rainwater barrels)
- Access (by stairs or more commonly by elevator, plus method for getting soil and equipment in place)
- Safety railings and fall protection
- Greater protection for roof membrane (from digging tools)

## Benefits

There are a number of advantages that rooftop gardens have 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.

Despite concerns about contamination of urban food because of poor air quality, tests have shown that generally urban food is less contaminated than that grown in suburban situations. (Smit et al, 1996). This may be explained by the fact that plants absorb contaminants through their roots rather than through leaves. Therefore, it is soil contamination rather than air pollution that is the biggest risk for food plants.

Rooftop gardens offer strata residents and perhaps employees access to gardening and green space that they 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 and growing things is important to a quality of life. Green roofs add to that quality of life for those that look down upon them.

## Type and Size of Space Required

Most of the buildings at SEFC are likely to be flat-roofed, concrete buildings. These roofs make ideal candidates for rooftop gardens. Concrete buildings require little additional structural reinforcing to accommodate a roof garden and therefore the cost increments are small compared to those of a wood frame, or even a steel frame building.

The fact that virtually all buildings will be new construction, makes the opportunity of rooftop gardening at SEFC quite significant. Based on the draft structure plan provided by the City of Vancouver (Figure 2-2) there is likely to be over 8 hectares of rooftop space in SEFC. However, the rooftops of high rise towers are far more challenging to implement rooftop gardens. Based on rooftops under seven storeys, the total area of usable rooftop space is 5.5 hectares.

The following building types at SEFC offer a range of rooftop gardening opportunities. Rooftop gardens should be carefully planned to fit the building type and use and designed to fit the interests of the future occupants:

Building Type	Description	Opportunities	Management Model
Market Residential	Concrete/steel; high/med/low rise; 3 – 26 storeys	Private allotments; contract vegetable grower; lease for greenhouse grower	Strata Council Landscape Committee
Non Market Residential	As above; 20% of buildings on City owned land	Private allotments; contract vegetable grower; lease for greenhouse grower	Strata Council/Co-op; Landscape Committee
Family oriented	3- 8 storeys. As above; 35% of buildings on City owned land	Private allotments; integrated with common area; kids play area	Strata Council/Co-op; Landscape Committee

Commercial	Office, retail, light industrial	Employee relaxation/recreation area; contract vegetable grower to produce food for cafeteria/employees; leased for greenhouse.	Owner managed; lease to commercial grower or restaurant operator
Public buildings	Community centre, school	Demonstration rooftop garden; integrate with stormwater harvest system	Non – profit management group; city operated; partnership with commercial operator.

A community of people gardening together is an important social exercise that builds relationships – if popular, the spaces are treasured and committed people take good care of them. Community management and joint care of the area is important.

Commercial production on rooftop gardens, while challenging, may be possible. This might range from someone using small planters to grow herbs on the roof to sell at the farmers markets to a 5000 square foot rooftop greenhouse leased to a commercial grower.

Generally podium rooftop spaces are more amenable to urban agriculture than the roof decks of towers. This is for three reasons.

1. Unlike tower roof decks, podiums do not require an extra elevator floor for access purposes
2. Wind speeds are likely to be lower on podiums
3. Urban design standards that require buildings to be sculpted and the requirement to house mechanical equipment mean that the usable space of tower roof decks is generally much smaller than podium spaces.

### How much food could be grown?

The total area of building footprints (and therefore approximate rooftop space) shown on the draft structure plan is approximately 85,000 sq metres (over 8 hectares) but only 5.5 hectares of these roofs are usable. Assuming conservative yields of 26,000 kg/Ha., if half (2.75 hectares) of this rooftop space at SEFC were used to grow food plants it could generate around 4% of the produce requirements of 10,000 people.<sup>17</sup> If rooftop hydroponic greenhouses were used, this figure could be increased to over 60%<sup>18</sup>. However, it is unlikely that all this space would be devoted to food production under current situation, but the exercise illustrates the potential for urban agriculture on rooftops in this part of the city.

<sup>17</sup> 26,000 Kg/Ha. X 2.75Ha. = 71, 500 Kg. 71,500/1,600,000 = 4.4%

<sup>18</sup> 346,000 Kg./Ha. X 4 Ha. = 951,500 Kg. 951,500/ 1,600,000 = 59.5%

## **Challenges**

### **Design**

In order to ensure their long term viability and the structural and envelope integrity, buildings that may conceivably used for rooftop gardens should be designed with pertinent engineering and horticultural criteria in mind, from the outset.

Access, for example, has to be planned. This is most often done by extending the elevator shaft to the roof deck or adding stairs. If the elevator will be used for plants, soil, tools and muddy boots on a regular basis, then a service style elevator may be preferred. This requirement for extending the elevator shaft for high-rise rooftops probably means they are economically unfeasible. Therefore, we should focus attention on roof decks and podiums that will already have elevator access.

If building height and floor space ratio (FSR) restrictions are fixed then the maximum height and FSR will be limiting factors if ancillary buildings are included in the calculations. In addition, trees, railings, trellises and vines on the roof deck might impede views and impact allowable heights.

Wind is a key issue –third and fourth floor podium roof decks are fine, but tower podiums may be very windy. It can be hard to get plants established in those conditions. Wind will also dry out soil very quickly and increase the need for irrigation.

### **Maintenance**

As with most other types of urban agriculture, a rooftop garden needs ongoing attention. Beyond initial design considerations, therefore, it is important that ongoing management be organized. There needs to be a system to sustain and nurture the green roof while it gets established and through the course of all the seasons. Building managers have been known to turn water off to planters because they don't want to take care of them. It is important to get the management group, building superintendents and residents involved early in the planning/design process and right through occupation. It may be necessary to design a safe failure response – i.e. a system that is easy to retrofit to a low maintenance design. The design has to be able to respond to the varying degrees of interest in gardening that will inevitably occur over the life of the building.

In addition, the following points characterize other challenges facing rooftop gardens:

- Key issues for strata management – will they see it as a liability? If one strata group isn't interested, could they rent out space to others?
- Secure access to the rooftop may cause additional management concerns.
- Who will use the rooftop garden –condo, residents, employees, public, commercial growers?
- How will the garden be accessed – people and materials
- Regulatory, and building codes may inhibit rooftop gardens
- Safety and liability concerns must be addressed
- Aesthetics will play a large part in marketability

### **Cost**

Based on a rooftop area of 400 square metres and the installation of deep lightweight soils, irrigation, duck boards and a tool shed and picnic table, estimated costs of this option:

\$143.00/ square metre (not including structural, access or safety premiums).

Concrete buildings will require additional 1-2cm thickness in roof deck (a very small percentage of total building structural cost).

## Evaluation

	Advantages	Disadvantages
Social	Provides a social meeting/contact place; offers views to the city within an attractive environment; creates learning opportunities; creates passive recreation opportunities; enhances the view of those looking down upon adjacent rooftops	Urban dwellers will need training; necessitates a trained building management super/company; concerns re building envelope integrity could be transferred to concern re rooftop membrane integrity
Environmental	Provides an additional reason for residents to recreate near home and therefore reduce local travel; enhances bio-diversity; can utilize harvested stormwater; enhances solar uptake capacity; reduces urban heat island effect. Energy efficiency Reduction in solid waste through composting of organic material Increased wildlife habitat	Irrigation water demand will increase in summer;
Economic	Can marginally reduce food costs; increases life cycle of roof; could be a potential revenue generator via lease fees to a commercial grower; rooftop common areas could be counted as part of the common area requirement	Does not provide a multiplier effect; does not create jobs; increases construction costs; could increase building management costs.
Other	One of the most effectively transferable urban agriculture strategies; can be converted to other uses relatively easily	Not yet an accepted construction method in Canada; will meet with some resistance from developers.

## Implementation

We recommend pursuing rooftop gardens aggressively at SEFC.

### Planning and Land Use

It is important to provide the opportunity for urban agriculture on roofs, but not to regulate this form of landscape/architecture. The Official Development Plan and zoning processes should be the portal through which urban agriculture on rooftops is addressed. These processes integrate the various criteria that will affect the economic viability of a given development and the sustainability goals of SEFC. Rooftop gardens trigger FSR, height, access, land use and other crucial development and livability issues.

Once proven on one or two buildings, the city could decide to require the inclusion of rooftop gardens on new flat-roofed residential developments, commercial buildings, and public buildings and include specifications in design guidelines for the SEFC zones.

- A catalogue of urban agriculture benefits could be developed that includes economic advantages for green roofs.

- Monitoring of urban agriculture on green roofs is necessary in order to evaluate their benefits, economics and management impacts.
- The SEFC sustainability model could include a research and development component of green roofs.
- It is important to have champions and a sense of ownership of the rooftop area, and this can be accomplished through:
  - Allocating garden plots to residents / specific users
  - Programming the space to respond to the widest possibility of users
  - Involving all users in the planning / design phase to get buy-in and support

## Incentives

The City could allow:

- Flexibility in height restrictions and FSR for the purpose of rooftop greenhouses, rooftop vegetation, and ancillary rooftop buildings such as tool sheds.
- Relaxation of height restrictions for the first buildings to integrate rooftop gardens as demonstration projects.
- CAC/DCL reductions to encourage the inclusion of rooftop gardens.

## Design

- The roofs of all concrete residential and commercial buildings should be flat and designed with enough structural integrity and mechanical servicing to accommodate the use of an agricultural rooftop garden or greenhouse in the future.
- Design the roof so it can be flexible to ebbs and flows in demand and interest while at the same time mitigating the potential for a messy appearance.
- Protection of membrane an issue – from tools, etc... protection board and layer of gravel needed. Past development/design technology have caused some leaks with rooftop planters and green roofs, but current design and technology easily have overcome this. The soil medium actually can prolong the life of the roof membrane through protecting it from exposure.
- Podiums will be better than tops of towers for urban agriculture uses – tops of towers are less safe and sometime present a hostile microclimate – protection from wind on podium is easier
- All rooftops should be designed to be accessible.
- Railing/fall protection is required. This can be accomplished through planters on the perimeter of the roof.
- Irrigation – both rainwater harvesting and hose bibs are required. Rainwater can be stored in a green roof landscape in several different hidden and visible means.
- A minimum 500 mm depth of high quality engineered soil is required.
- Access is a critical issue for urban agriculture rooftops:
  - What internal spaces must users pass through to get to the garden space and move soil, plants, etc...
  - A freight/moving elevator may be required
  - Exit requirements as per the Building Code must be met



- Design guidelines including precedents, costs and management options should be created to assist developers and building managers
- Seating and social spaces should be incorporated in rooftop gardens
- Roof drainage systems must accommodate additional potential sediment loading from runoff.
- Design rooftop spaces to be visible from many units – this will encourage people to maintain and use them frequently. Podium gardens may be more appropriate than tower roof gardens for this reason.

## **Programming**

Two types of programming tools are available that would enhance the potential for successful urban agriculture on roofs in SEFC:

1. Community education
2. Building programming

### **Community Education**

- Public buildings offer opportunities – school gardens on the roofs, improving nutrition of children, public demonstration garden or lease out space to others to use for demonstration garden.
- Advice and guidelines for strata corporations to develop a rooftop garden, capture and use rainwater, re-use grey-water on rooftops and grow food plants

### **Building Programming**

- If Olympic athletes housing is built in SEFC, any green roofs will need ongoing maintenance
- There may be small growers (e.g. specialty herb and salad growers) who could make a business out of growing on roofs – a unique niche not occupied by larger food producers.
- Strata councils could lease out their green roof space
- Commercial opportunities could include hiring gardener to grow food for residents in building

## **Case Studies and Precedents**

Click on hyperlink or see Appendix B

- [Fairmont Waterfront Hotel, Vancouver](#)
- [Foodshare, Toronto](#)
- [Royal York Hotel](#)
- [Mary Lambert-Swale housing project](#)
- [Toronto City Hall demonstration project](#)
- [Ecohouse \(St. Petersburg\)](#)
- [Microfarm Group, Brisbane, Australia](#)
- [Eli Zabar, New York](#)

## 6.4 Option G4 – Balconies, Window Boxes

### Description

In a high density community dominated by residential towers, balconies and window boxes may be the only outdoor space in which residents will be able to grow edible plants. Plants are generally grown in pots and other containers on balconies - an obvious limiting factor to food production potential. However, a surprising volume and range of produce can be grown through a series of established and innovative systems. Growing plants vertically, for example, can maximize the harvest from relatively small soil volumes.



Figure 6-2: Window Box. Photo: Sustain, UK

Figure 6-3: Balcony Conservatory. Photo: Sustain, UK

### Benefits

Balconies and most window boxes are accessible and therefore are less likely to be neglected than some other spaces. Efficient food production methods such as growing food on walls, trellises and in stacked containers maximizes the productivity of balcony spaces for urban agriculture. As long as sunlight, nutrient and access requirements are met, plants can be grown in compact horizontal and vertically arranged containers that create yields greater than those that would be obtained by using the nominal area.

Balcony and window box gardens will not contribute significantly to the volume of food produced in SEFC. They offer other benefits, including:

- Opportunities for novice gardeners to experiment with plants, soils and harvesting
- Potential to grow specialty plants that are consumed in small volumes (parsley and other kitchen herbs)
- The greening of buildings, enhancing livability.

### Type and Size of Space Required

Personal outdoor living space is a hallmark of sustainability. As a result, it is anticipated that balconies will be common in SEFC with most units including at least one such space.

Zoning permitting, some owners may choose to incorporate a greenhouse into the balcony which would further extend the growing season and enhance the production capacity of the balcony area.

The potential for window boxes will be determined to a great extent by the architectural detailing and environmental conditions. For safety reasons, it may not be acceptable to allow window boxes above a certain height.

The school and community centre could readily accommodate an urban agriculture window box program.

### **Type and Size of Balcony and Window Boxes**

	Description	Comments
Type	Balcony: built in or portable plant containers;  Window box: temporary or permanent anchored containers accessible through a window	Concrete or plastic containers are more resistant to wind and dessication;
Size	Balcony: minimum area required: .75 square metre  Window box: min. volume: 175mm deep x 175mm wide	South facing desirable, but not essential. Drainage to prevent drips of irrigation overflow is NB.

### **How much food could be grown?**

There will be six thousand units at SEFC. It is reasonable to assume that at least five thousand of these will have one or more balconies. However, balconies are generally not productive growing spaces and what space there is on a balcony has to accommodate many uses. Assuming that 2 square metres of space per balcony is used, this would give us 5,000 sq. metres = 0.5 Hectare of growing space. Assuming relatively low yields, if all of the potential space were used for urban agriculture purposes it could generate 13,000 Kg of produce, which is approximately 0.75 % of the community's annual needs.

### **Challenges**

Building access, height and environmental constraints will challenge the balcony/window box gardener in the following ways:

Balconies need to accommodate many different needs including space for plants.

Many balconies are designed with overhangs and many will not have ideal solar access and this can limit the amount of sunlight on a balcony.

Some food plants require a consistent nutrient supply to develop properly and mature to fruiting and some will quickly exhaust the soil in a container unless supplemental nutrients are added.

## Cost

Based on installing planters/pots, soil and irrigation for 1 balcony with ~ 1 metre square of area in pots, the estimated costs for this option: \$ 388.00 per unit.

## Evaluation

	Advantages	Disadvantages
Social	Create more attractive buildings from public realm	Private, individual so doesn't include social contact
Environmental	Provides an additional reason for residents to recreate near home and therefore reduce need to travel; can utilize harvested stormwater;	Irrigation water demand will increase slightly in summer
Economic	Can marginally reduce family food expenditures;	Does not provide a multiplier effect; does not create jobs; increases developer costs slightly.
Other	Very transferable; can be uninstalled easily Easy to implement	Not innovative. Little public educational component.

## Implementation

Balcony gardens are relatively easy to implement and we recommend pursuing balconies for food production at SEFC.

## Land Use and Site Layout

None

## Zoning

Address provision of balconies and balcony design in zoning for SEFC.

## Incentives

None

## Design

- Balconies should be designed to maximize solar access.
- Balconies could be designed with growing containers built into them, with soil deep enough to grow quality produce.
- Water supply and drainage should be integrated in balcony design.
- Soil, pots and fertilizer storage areas should be incorporated in each floor of high rise residential buildings
- Designers/planners should consider the use of vertical growing space and solar access to these spaces when reviewing landscape proposals and building designs. This might include trellising and arbours included as part of the proposal for balcony design.

### **Programming**

- An “*urban agriculture for balconies*” guidebook should be considered as part of an overall educational program for SEFC.

### **Case Studies and Precedents**

None included

## 6.5 Option G5 – Edible Landscaping of the Public and Semi-private Realm

### Description

Edible landscaping is the term used to describe the practice of using food-bearing plants for landscaping purposes in place of more commonly used ornamental plants. This typically occurs in private backyard gardens but, until recently, has not often occurred in the public realms of streets, parks and condominium landscapes. At present, as a matter of policy, most trees and bushes planted in the public realm are planted for aesthetics, shade or habitat values rather than food value. While there are some fruit trees lining our City streets, and blueberry bushes have been planted in some progressive landscape designs, food plants are the exception.

The Street Tree bylaw gives Vancouver Parks Board and Engineering Services the responsibility for the selection, planting and maintenance of street trees. Crabapple, Cherry and Plum are all on the list of recommended street trees for Vancouver but generally the non-fruiting cultivars are used.

Although current Park Board policy does not endorse the planting of fruiting varieties for street trees there is no reason why they could not be used in the SEFC park. Edible landscapes can also include:

- Seasonal greens that also offer colour and texture to the landscape
- Integration of vegetables in flower gardens – an aspect of bio-dynamic gardening
- Ethno-botanical landscapes that interpret First Nation's use of edible native plants
- Celebration gardens: specifically designed to coincide with solstices, equinoxes, Halloween etc.

### Benefits

Fruit and vegetable plants of all forms, grown in the public realm not only enhance the food production capacity of a community, but they also add a layer of landscape meaning that few other vegetation patterns accomplish. The ripening apple is a harbinger of fall, blackberries the onset of summer heat, Brussels sprouts sweetening in cold winter frosts- all of these sights strengthen our connection with the land. As a social benefit, as much as a production benefit, edible landscapes enrich the urban experience.

### Type and Size of Space Required

The edible landscape philosophy could be applied across virtually all of the planted lands in SEFC. It would be opportune to integrate visual, privacy, habitat and other vegetation criteria with the edible landscape approach in the park, rights-of-way, and semi-private garden plantings.

### How much food could be grown?

Choosing an edible landscape approach across parts of the SEFC model community will enhance the food production capacity. To what extent it will actually meet a percentage of the food needs of SEFC is virtually impossible to determine.

## **Challenges**

Current City and Park Board policies discourage fruiting cultivars in public landscapes. These policies are a response to several issues that need to be addressed if this option is to be viable:

- Liability – because fruit can be large and heavy, falling fruit could damage property. In addition, if fruit is not picked, it may attract wasps and other undesirable insects and lead to insect bites and stings.
- Appearance – fruit trees can be messy when they drop fruit on sidewalks, staining sidewalks and clothing and when tracked indoors, staining carpets.

Generally these issues revolve around maintenance and land management considerations. Management mechanisms are needed to properly maintain and harvest fruit trees and other edible landscapes in the public realm.

The Street Tree Bylaw and the powers it places solely in the Vancouver Board of Parks and Recreation currently limits the extent to which food-bearing plants could be incorporated on City streets and within City rights of way. As it is now written, the Street Tree Bylaw does not anticipate, nor encourage, the planting of street edges for urban agriculture purposes, nor does it anticipate the planting and maintenance of any type of tree by other than City or formally authorized experts.

As urban agriculture within SEFC evolves, it is possible that a range of participants will be involved in the planting, care and maintenance of trees within what is now formally considered an area where laymen and novice gardeners are expressly forbidden.

The Park Board does not have the resources or the expertise to manage fruit or nut producing trees at this time. Consequently, if City street verges, boulevards and other rights of way are to be used for this type of urban agriculture new systems for managing these lands would be required. These new systems would have to be acceptable within a revised Street Tree Bylaw.

The street tree standards referenced in the bylaw would also have to be modified, but as an overarching, city-wide “enabling” document, the Street Tree Bylaw should be amended to permit, if not encourage, urban agriculture in the City of Vancouver.

Innovative approaches to stewardship by local residents would be needed to ensure that pruning is undertaken correctly and harvesting occurs properly. At Village Homes in the City of Davis, California, the residents now produce and sell enough fruit from their street trees to be able to pay for the maintenance of their remaining public open space. Some cities also grow fruit trees in their parks - Stockholm, Prague, and Bangalore grow up to 25% fruit trees in their urban parks (Garnett, 1996).

## **Cost of this option**

Costs of this option should be equal to or somewhat less than the installation of traditional ornamental landscapes.

## Evaluation

	Advantages	Disadvantages
Social	Enhances our understanding of food source in a very visible way; potential to interpret ethno-botany integrates cultural, food and educational objectives; involves citizens directly in the management of the landscape	The edible landscape is not an accepted aesthetic; training of gardeners and interpretation is required
Environmental	enhances bio-diversity; can be integrated with habitat and native plantings; can utilize compost and stormwater	Irrigation water demand will increase marginally in summer;
Economic	Can marginally reduce food costs;	May require additional maintenance, depending on the level of seasonal plantings
Other	One of the most effectively transferable urban agriculture strategies; can be converted to other uses very easily	

## Implementation

In the public realm (streets and parks) the Parks Board should:

- Adopt a policy of planting fruit-bearing trees on certain streets in SEFC. In most cases fruit trees will likely not be appropriate because there are several other objectives of street trees such as shade, habitat value, and architectural considerations. However, it may be appropriate to experiment with fruit bearing cultivars in some situations where fruit trees can achieve a variety of design criteria.
- That is, in situations where a non-fruiting fruit tree would currently be planted, consideration should be given to planting a fruit tree where stewardship responsibilities can be assigned.
- Adopt a policy of edible landscaping in selected parts of the waterfront park. This might include the planting of heritage varieties that have an educational value as well as food and aesthetic value.
- Encourage the formation of neighbourhood stewardship groups (see Fruit Tree Project Case Study) who would take on the responsibility of pruning and harvesting in return for keeping/distributing the fruit.
- Offer expert advice (through animateur) to the urban gardeners wishing to grow fruit trees
- Create edible landscape design guidelines that integrate ethno-botanical research

In the semi-private realm the City of Vancouver should:

- Require developers (and their designers) to incorporate edible cultivars into landscape plans
- Include the above in the landscape design guidelines for SEFC
- Work with a non-profit society such as SPEC, City Farmer or Farm Folk/City Folk to develop a guidebook that provides advice on how to successfully incorporate edible plants into private landscapes.

## Case Studies and Precedents

Click on hyperlink or see Appendix B

[Fruit Tree Project](#)

[New York City Care of Trees](#)





## **6.6 Option G6 - Commercial Greenhouses**

### **Description**

Commercial greenhouses can be soil-based or hydroponic. The trend for modern greenhouse operations is towards very large, technologically advanced, hydroponic greenhouse operations that produce a single crop: most commonly tomatoes, cucumbers, peppers or lettuce. In the SEFC context, the scale, diversity of crops and type of productivity will warrant a different type of operation. There are a number of smaller, family run greenhouses in British Columbia that focus on organic, soil-based growing and produce a much wider variety of crops. These may be a more appropriate model for SEFC than the industrial scale of operation that is common in Delta and other parts of BC.

### **Benefits**

Urban commercial greenhouses could produce a large percentage of the community's food needs, significantly reducing transportation requirements and reducing the need for residents to travel outside the community and for produce to be shipped in.

A commercial greenhouse could be interesting land use in its own right and if designed properly can add visual interest to an urban landscape. A working greenhouse would add interest and vitality to the community.

Waste heat from buildings and industrial operations can be captured and re-used by greenhouse operations which can also benefit from increased levels of carbon dioxide, which increases plant growth.

### **Type and Size of Space Required**

If producing a large proportion of the community's food is considered an important objective, then commercial greenhouses would be the option of choice. However, no suitable land has been allocated to this type of use at SEFC (see market gardens). Without land dedicated to urban agriculture, commercial greenhouses will not be able to compete economically with other urban land uses, especially residential. A greenhouse system could however, be located on a large floating barge on False Creek. The greenhouse could use either a soil based or hydroponic system. A retail outlet could also be associated with the greenhouse so that intra-community transportation was reduced and this would make the greenhouse operation more economically viable than a traditional model of selling into the wholesale market.

Aside from land dedicated to urban agriculture, commercial greenhouse space could be created on some of the larger rooftops in SEFC. Although this would involve operational inefficiencies (bringing supplies up an elevator or exterior lift system), commercial greenhouse space on the roofs (or more likely podiums roofs) of the medium and high rise buildings within the study area could generate food volumes that may attract enterprising growers. Some of the rooftop spaces will be 10,000 sq. ft, which is a reasonable size for a specialty commercial greenhouse operation.

The Parks Board may choose to include a small-scale greenhouse in the Waterfront Park as both an educational and income generating venture. The greenhouse could be linked with a Park Restaurant to

demonstrate a very close link between food production and preparation, an increasingly popular direction taken by innovative BC chefs. Customers could then dine adjacent to the food crops they are eating.

### **How much food could be grown and revenues generated?**

Average yields for BC Commercial Greenhouse operations are 346,000 Kg/Ha. Therefore, one hectare of commercial greenhouses could likely 20 % of the community's vegetable needs and generate \$280,000 in revenues at wholesale prices.<sup>19</sup> This however, reflects industrial-scale production sold to wholesale and, therefore, a fairly low price per kilogram. Incomes for small-scale greenhouses growing specialty products and retailing directly to buyers can generate much higher revenues.

Karl Hahn, a local expert on organic greenhouses, suggests that two people working full-time could run a successful specialty (organic) commercial greenhouse operation on 0.1 hectare of land, generating perhaps \$40,000 annually in profit (wages). Karl suggests that an annual revenue of \$120 per square foot of greenhouse is achievable by retailing specialty crops directly from the greenhouse instead of wholesaling the product. (Hahn, 2002)

### **Challenges**

Commercial greenhouses require land zoned for agriculture otherwise they cannot compete with other urban land uses.

Unlike open field agriculture or gardening, greenhouses are non-porous surfaces and therefore do not contribute to stormwater management goals.

Most commercial greenhouses use natural gas to heat the greenhouse and also produce carbon dioxide, which stimulates plant growth. This, combined with the materials used for greenhouse construction and the nutrient solutions used to fertilize the plants mean that commercial greenhouses generally have a much larger ecological footprint than open field production methods of growing (Wada, 1993).

Commercial greenhouses do not allow for much participation or education by the community unless educational programming is built into the greenhouse operation.

Many of the challenges for commercial market gardens also apply to commercial greenhouses.

### **Cost of this option**

The most cost-effective greenhouses used for many commercial agriculture operations are plastic hoop greenhouses. Materials cost as little as \$2.50 per sq.ft.<sup>20</sup>

Glass (or poly-carbide) greenhouses are more likely to cost \$20 -\$25 square foot installed.

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<sup>19</sup>Based on average yield and sales value of Greenhouse Vegetable Production in British Columbia, 1992. BCMAFF Horticultural Statistics, 1992.

<sup>20</sup> Prices based on internet research of 10' x 40' Polytunnel.

There will be a premium for installing the greenhouse in a rooftop location and additional price considerations for access may have to be included.

## Evaluation

	Advantages	Disadvantages
Social	Interesting educational opportunities Large quantity of food produced	Possible odours if not managed correctly Few opportunities for residents to participate in growing food.
Environmental	Pests can be managed biologically (organically) in controlled environment. Large quantity of food produced reduces residents need to travel outside of community and reduce food transportation. Can re-use waste heat, water, compost.	Creates impervious surface Uses energy to heat and material/energy to construct
Economic	Can generate significant revenues if properly managed. Local economic development and multiplier effect.	Cost to build is much higher than gardens especially in rooftop situations. Requires dedicated land use and therefore would reduce density (and revenues for City) of residential buildings.
Other	Would make an interesting and worthwhile demonstration project on land retained by the City or Parks Board.	

## Implementation

We recommend that a small-scale commercial greenhouse be allowed as a demonstration project at SEFC to demonstrate the feasibility of greenhouse operation in a dense urban neighbourhood and retailing directly to the public.

### Land Use and Site Layout

- Small-scale commercial greenhouses require land (or at least floating barges) dedicated to this use.
- Probably suitable in this location as a demonstration project only – either on land the city retains and leases to a greenhouse operator or on Park Board land as part of a high-end restaurant. Co-operation of innovative chef required. (See Fairmont Waterfront Hotel roof garden case study).

### Zoning

- Land for a commercial greenhouse needs to be zoned, very specifically for this use and hence avoid competition from other higher return uses. This would require a change in existing policy as commercial greenhouses are not an allowed use in most of the city. The City needs to choose whether or not they want to support urban agriculture in this way as a public good. This has parallels with the way that rural agriculture is protected (and often subsidized) because we value the public benefits that agriculture brings such as food security and economically viable rural communities.

- A retail outlet should be permitted as an ancillary building to the greenhouse. This would reduce the amount of commercial vehicle trips required and to add interest to the operation.
- Allow commercial greenhouse space on the roof of buildings – in most cases building owners will not want to pursue this option but there may be some developers who see an interesting marketing angle and potential business case in this approach. Those who do should be encouraged by not including rooftop greenhouses in FSR or height calculations.

### **Design**

- Encourage designers to examine ways to reduce energy consumption of greenhouses. Greenhouses should be designed to maximize passive solar gain. It may also be possible to harvest waste heat (and carbon dioxide) from buildings or commercial/light-industrial operations. Waste water/stormwater may be used for irrigation.

### **Programming**

- Any operator should be encouraged to include educational programming into the operation to increase the level of multi-functionality.
- Organic approaches are preferred and may be required if city retains ownership of land and leases to commercial operator.

### **Case Studies and Precedents**

Click on hyperlink or see Appendix B

[Microfarms With Great Returns](#)

[Inuvik Greenhouse](#)

Karl Hahn's greenhouse operation

## 6.7 Option G7 - Commercial Market Gardens

### Description

Commercial market gardens such as those in Burnaby's Big Bend area are typically operated on small farm lots (less than ten acres) and make use of large amounts of labour and typically less machinery than larger scale farms. Some of the case studies below indicate that commercial farms of less than one acre are possible but more commonly a few acres of land is preferred. Market gardens generally grow a variety of produce, usually focusing on highly perishable items that fetch a high price. This is in contrast the large-scale monocultures that are dominant on grain and potato farms. Some market garden operations sell directly to the public through roadside stands or small retail outlets. Others sell directly to grocery stores or may sell to a wholesale.

### Benefits

Producing food at the commercial scale of a market garden is more likely to deliver a much greater quantity and consistent quality of food than that produced by amateur gardeners. In addition, the City has a greater opportunity to regulate the activity. Producing a significant amount of the residents food would mean that travel outside of the community as well as the transportation of food goods would be reduced i.e. it would go some way to meeting the goal of a complete, mixed use community where the daily needs of residents are met within the community.

### Type and Size of Space Required

A commercial market garden operation can be operated successfully on as little as a city lot under very favourable growing conditions but most operations will require a larger amount of land, perhaps a minimum 0.5 hectare with good quality soils. As currently designed, the draft structure plan offers no opportunity for a market garden on a commercial scale. Therefore, the structure plan would have to be redesigned to accommodate this use with the trade-off between residential/commercial building and market garden use. Given that the primary role of SEFC is for high density housing near to downtown jobs, it is probably not appropriate to do this

### How much food could be grown?

Market gardening tends to be very high yielding in the lower mainland because the climate allows several crops to be grown in a single season and the approach is very labour intensive with dense plantings and polycultures allowing yields to be maximized in small areas. Therefore, we can assume that yields would be on the higher end of the spectrum probably in the range of 50,000 kg/Ha. 1 hectare of land used for market gardening would yield about 3 % of the community's vegetable needs.

### Challenges

In theory, a commercial operator could run a successful market garden in the SEFC neighbourhood and indeed there are examples across North America where urban farmers manage to extract a good living from very small spaces. However, the main challenge for a commercial market gardening approach at SEFC is the trade-off necessary if land is used for agriculture rather than high density housing or other more traditional

uses. Private land owners of course would not choose to allocate high priced urban land for agricultural purposes when the potential return from most other uses would be much higher. The high value of urban land would mean that for market gardens to exist, the City would have to intervene and zone some land as agricultural in the interests of the public good. This approach may be appropriate in some areas but probably not in the context of SEFC.

Soil contamination (actual or perceived) may also threaten the viability of market gardens. Food plants will absorb contamination through their roots and therefore soil used for growing needs to be thoroughly tested.

There may also be a problem with vandalism and crop theft.

### Cost of this option

There is no cost for a commercial market garden to the City once clean soil is in place. The operator would be responsible for seed, soil amendment, equipment, marketing and labour costs.

### Evaluation

	Advantages	Disadvantages
Social	Interesting educational opportunities Interesting activity Reasonable quantity of food produced	Possible odours if not managed correctly Few opportunities for residents to participate in growing food.
Environmental	Does not create impervious surface Reasonable quantity of food produced reduces residents need to travel outside of community and reduce food transportation. Can re-use waste water, and compost.	Possible rodent problem if compost not managed properly.
Economic	Can generate local revenues and meaningful jobs for marginalized people. Cost to implement is low.	Requires dedicated land use and therefore would reduce density (and revenues for City) of residential buildings.
Other	Could make an interesting and worthwhile demonstration project on land retained by the City or Parks Board.	

### Implementation

We do not recommend pursuing commercial market gardens at SEFC although they may be appropriate for other areas of the City of Vancouver.

### Land Use and Site Layout

- Even though some case studies demonstrate that high value crops can be grown in urban situations, commercial market gardens could not compete economically with residential land uses in SEFC. Therefore, commercial market gardens could only occur if land was zoned specifically for this purpose. Alternatively the City could retain ownership of the land and choose to lease it to a commercial operator (perhaps as a trial operation lasting five years). There would need to be a reasonable security of tenure for the operator to make it worth their time and investment.
- Land needs to be in a sunny location.

### **Zoning**

- The land for market gardens would need to be zoned accordingly and may place restrictions on the type of crops, hours of operation, use of machinery, use of manures, use of chemicals etc. to ensure that the operations of the market garden did not negatively impact the residents of the neighbourhood.

### **Incentives**

- Cheap land or low lease rates combined with guaranteed terms of tenure would initially attract specialty growers to grow at SEFC. This, combined with a large market and the possibility of retailing directly to the public would be sufficient incentive for urban agriculture entrepreneurs.

### **Design**

- If this option is pursued, certain standards of appearance should be required of the grower, either as part of a lease contract or as part of the zoning.

### **City Investment**

- The City could take lead role by retaining ownership of some land at SEFC and leasing to a commercial grower. The City could put out a request for proposals and select a proposal that maximized the educational and training opportunities provided by the grower.
- The city could hire an urban farmer and run a small-scale market garden to generate income.

### **Programming and Education**

- Training of specialty growers who can operate a market garden on a small piece of land.
- Link gardens with educational initiatives for backyard and community gardeners.

### **Case Studies and Precedents**

Click on hyperlink or see Appendix B

[Big Bend Burnaby](#)

[Kon Kai Farms, Berkeley, California](#)

[Sausalito, Cal](#)

[FoodShare](#)

[The Silwood Family](#)

[Toh Orchids](#)

[Greensgrow Philadelphia Project](#)



## 6.8 Option G8 - Inside Buildings

### Description

Some crops such as mushrooms and seed sprouts (such as alfalfa) can be successfully grown indoors, either in the dark (as with mushrooms) or using artificial light. This can be done on both a commercial or non-commercial level. These crops can generate a high value from relatively small space requirements and recent technological improvements have reduced the problem with odours traditionally associated with commercial mushroom growing.

### Benefits

Growing indoors opens up the possibility of using unused indoor space (empty parking stalls for example) as productive space. Indoor growing allows the operator to control the process to a greater extent.

### Type and Size of Space Required

As presently structured, the draft structure plan offers few if any commercial-scale opportunities for indoor growing but there may be semi-commercial opportunities in underground parkades if parking stalls are not occupied. Building residents may want to use their parking stall for mushroom growing or rent it out to a small-scale operator.

### How much food could be grown/revenue generated?

Richmond Specialty mushrooms report that 100 kg of mushrooms can be produced from one shipping container per week throughout the year. This is worth \$500 - \$800 if retailed directly to the public as part of the operation.

### Challenges

Using artificial light indoors may conflict with energy saving strategies for the community. Odour and insect problems may generate land-use conflicts if not properly managed.

### Cost

None to the City.

### Evaluation

	Advantages	Disadvantages
Social	Interesting educational opportunities Reasonable quantity of food produced Opportunities for residents to participate in growing food.	Possible odours and insect problems if not managed correctly leading to land use conflicts.
Environmental	Minimal impact on local travel needs. Minimal opportunities for waste recycling.	Uses energy to heat/light operation.

	Advantages	Disadvantages
Economic	Can generate reasonable revenues.	Cost to build is much higher than gardens especially in rooftop situations. Requires dedicated land use and therefore would reduce density (and revenues for City) of residential buildings.

## Implementation

We recommend that the City encourage this option in selected buildings, perhaps as a small demonstration project initially to see if idea catches on and potential negative issues can be managed adequately.

## Land Use and Site Layout

Not affected

## Zoning

Encouraging indoor agriculture would entail allowing commercial indoor food production operations in zoning schedule in appropriate locations. Zoning needs to create appropriate restrictions to minimize land use conflicts.

## Incentives

None necessary.

## Design

Designers may consider parking garages for indoor growing operations. Provision of power supply and hose bibs.

## Education

Training for residents and strata councils on how to grow crops successfully indoors.

## Programming

Building owners may allow appropriately scaled, well designed operations in parking garages that are underused.

## Case Studies and Precedents

Click on hyperlink or see Appendix B

[Chicago Indoor Gardens](#)

[Philly Mushroom Farms](#)

[Richmond Specialty Mushrooms](#)

[Foodshare \(Sprouting Operation\)](#)

## **6.9 Option G9 – School Gardens**

### **Description**

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 gardens.

### **Benefits**

School food gardens can improve children's understanding of natural processes such as plant growth, soil formation as well as enhance their understanding of nature. Growing food can also assist low-income families with their food bills and provide children 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. Food can be used to supplement a school meal or snack program.

Organic gardening learned at elementary school is a skill that remains valuable throughout adult life. In an age where obesity and inactivity is on the rise, gardening is a healthy outdoor activity that encourages a healthy lifestyle.

All kinds of curriculum topics can be explored in garden settings, bringing theoretical topics to a very practical level.

### **Type and Size of Space Required**

There is a planned K-7 elementary school at SEFC and a number of daycare facilities will be required. All of these represent excellent opportunities for incorporating urban agriculture initiatives into the school landscapes, both as educational opportunities and for improved nutrition and dietary habits of the children and adults involved.

Depending on the method of construction used (wood frame, concrete) there may also be opportunities to use the rooftops of these buildings for gardens and outdoor classrooms. Obviously safety will be an important consideration with any such venture but if this possibility is considered early on the planning and design process.

To maximize the learning potential, it would be desirable to construct a greenhouse in which seedlings can be produced and in which some winter crops could be produced. This provides an opportunity for the students to be exposed to agriculture year round.

Any size of space is usable for this option.

## How much food can be produced?

This depends on the size of the school ground and how much is dedicated to food gardens. School ground gardens are often similar in size to community gardens and therefore have the potential to produce similar amounts of food as community gardens.

## Challenges

It is often challenging to get approval and support for school ground gardens through the School Board. They have concerns about safety (e.g. will someone shoot up in the garden and leave needles lying around), about conflicts with teacher-union contracts (i.e. who is responsible for landscape maintenance), aesthetics (will the gardens look untidy) and availability of teachers and other volunteers to supervise children's activity take on the project as an extra-curricular activity, and so on. There is also the issue of how to take care of the gardens throughout the summer months when plant (and weed) growth is at its highest and the requirement for irrigation the highest.

Despite these obstacles, NGOs such as Evergreen (national), Foodshare (Toronto), City Farmer (Vancouver) and LifeSpin (London, ON.) as well as many others have managed to develop highly successful school garden programs that overcome these obstacles.

## Cost of this option

School gardens involve costs comparable to public community gardens plus the time required for staff to supervise the children. Local gardening stores will often donate tools, seeds, and other supplies.

## Evaluation

	Advantages	Disadvantages
Social	Excellent educational opportunities for students and families Improved nutrition and food preparation knowledge. Improved visual aesthetic of school ground School yard used after school hours may prevent vandalism and increase pride in school landscape.	School gardens may be target of vandalism with crops thrown at buildings.
Environmental	Minimal, but as with other gardening options, compost can be used, waste-water used for irrigation.	None.
Economic	None significant	Small cost to design and build.
Other	Has lasting affect by giving children a life-long skill.	

## Implementation

We recommend the City work with the school board to pursue this option.

### **Land Use and Site Layout**

Implementation of this option will require the full support of the school board and future school principal. While the City can encourage school gardens, it has little jurisdiction over activity on school property. The Parks Board may enter in partnership arrangements with the school for the purposes of maintenance and these could be extended to include agreements regarding the education programming of school yards for the benefit of children and the surrounding community.

### **Zoning**

None

### **Incentives**

None necessary

### **Design**

The City might require schools and daycares to develop landscape plans that could accommodate gardening opportunities.

### **Education**

The Evergreen Foundation and LifeSpin both offer kits and guidebooks for developing school ground gardens and educational landscapes, including all the logistics of gaining School Board support, landscape design and programming, and managing children and volunteers.

### **Partnerships**

We recommend that the City strongly encourage the Vancouver School Board to develop a school ground garden for the K-7 elementary school and that the School Board partner with the Parks Board to develop educational programming for the school landscape.

### **Case Studies and Precedents**

Click on hyperlink or see Appendix B

[Grandview Woodlands School, Vancouver](#)

[Pocket-Sized Farms School Garden Program, London, Ontario.](#)

## **6.10 Option G10 - Aquaculture & Bioponics**

### **Description**

Aquaculture describes the intentional management of fish for food consumption. The world's most popular fish for culture is Tilapia. Unlike the farmed salmon we are familiar with in BC, tilapia are very hardy and can be successfully grown in land-based tanks. Tilapia produces a delicious white flesh with few bones. Native to Africa and East Asia (where they have been raised for centuries) Tilapia are a hardy, disease resistant fish that thrives in warm water.

The feed conversion rate for this fish is excellent, with one pound of feed yielding almost one pound of fish. Tilapia devour algae in addition to their regular feed, and excess plant cuttings add to this nutrient source. In addition, they will tolerate low oxygen and poor water conditions that would kill most other fish.

Bioponics combines 'Bio' (from the Greek bios - life, mode of life) with hydroponics techniques, by replacing the mineral nutrient salts conventionally used in hydroponics, with natural inputs of nutrients contained in fish effluent wastes. This is an elegant, simple and innovative system of food production that combines aquaculture and hydroponic vegetable growing techniques. The system is relatively simple and expensive equipment is not required.

Aquaculture is relatively untested in an urban environment although there are a number of recent examples in other cities. This option is probably best considered as a demonstration project rather than for widespread adoption at the new community.

### **Benefits**

Vegetables alone are unlikely to produce a varied enough diet for most people's needs. Fish may be a viable source of protein that we can raise in the city. Aquaculture and bioponics represents one of the most efficient ways to produce protein in an urban environment. Unlike most forms of livestock, these systems are relatively compatible with residential land uses and provide an interesting educational opportunity.

This option is a significant opportunity to reuse kitchen and restaurant wastes and can assist with the purification of waste-water as well.

This form of production is very popular in other parts of the world and would provide a source of culturally appropriate food for many ethnic minorities.

### **Type and Size of Space Required**

Tilapia (and some other freshwater fish such as Perch and crustaceans) are generally raised in land based tanks. These tanks might best be located in a greenhouse but might also be located on a floating barge on SEFC or other land at SEFC. Alternatively, these systems could be located in any building with due consideration for the weight of tanks.

## How much food could be grown?

At 7.84 kg per person annual consumption, a community of 5000 fish eaters would require 39,200 kg (86,240 lb.'s) of fish and shellfish annually. The reported yields of aquaculturally-raised fish vary immensely (as much as vegetable yields) depending on the type and intensity of the method used. The Farallones Institute (1979) report yields of up to half a pound of fish per square foot annually under intensive culture. Todd and Todd (1984) have managed to produce up to one and half times that amount using small scale, indoor techniques and pressure-cooked garbage as feed. Ballarin and Haller (1982) report astonishingly high experimental yields from Asia using Tilapia which they say is well suited for intensive pond culture. Table 6-1 shows reported yields in intensive and non-intensive (open pond) culture and the space required to produce the average fish/shellfish needs of the community of five thousand people.

Species	Approximate Annual Yield (pond culture)	Pond/Tank Space required to produce fish for 5000 people	Approximate Annual Yield (intensive culture)	Space required to produce fish for 5000 people)
1. Rainbow Trout	100lb./acre	862.4 acres	0.5 lb./ft. <sup>2</sup>	3.95 acres
2. Sacramento Blackfish	800 lb./acre	107.8 acres	N/a	N/a
3. Fathead Minnow	1000lb. /Acre (without supplementary feed)	86.2 acres	3000lb. /Acre (with supplementary feed)	28.7 acres
4. Bluegill	300 lb. /acre	287.5 acres	0.5 lb./ft. <sup>2</sup>	3.95 acres
5. Pacific Crayfish	400 lb. /acre	215.6 acres	0.5 lb./ft. <sup>2</sup>	3.95 acres
6. Tilapia, Catfish, Trout, White Amur, Mirror-Carp, Pacu	N/a	N/a	up to 1.3 lb./ft. <sup>3</sup>	1.52 acres
7. Tilapia (Asia)	2-8 tonnes/acre	4.8 - 19 acres	up to 100 tonnes / acre	0.4 acres

**Table 6-1: Yields of various fish species in intensive and non-intensive culture (sources: [1-5], (Farallones Institute 1979), [6] - (Todd & Todd 1984), [7] - (Ballarin and Haller 1982)**

## Challenges

This analysis reveals that the fish requirements of the entire community could theoretically be produced using as little as 0.5 acres of land. We should remember, however, that the more intensive production methods are energy and time intensive and require artificial systems to maintain the life support mechanisms of oxygenation, temperature and waste removal. We should also consider that fish have to eat too and the amount of protein gained from consuming fish will be substantially less than the amount fed to the fish. Ecologically then, this only makes sense if we use waste products to feed the fish (restaurants wastes or excess worms produced from worm composting) or find food sources unsuitable for human consumption.

## Cost of this option

Unknown – requires cost analysis.

## Evaluation

	Advantages	Disadvantages
Social	Excellent educational and research opportunities. High quality nutrition Culturally appropriate for some minorities.	Possible land use conflicts if not properly designed.
Environmental	Excellent waste recycling opportunities.	Possible odour problems if not managed properly.
Economic	Significant potential for small business and meaningful jobs for marginalized workers.	Significant start up costs. Possible impact on adjacent land values if not properly designed and managed.
Other	A novel approach that would distinguish SEFC as a progressive community.	A highly unusual approach in an urban community and therefore will meet with resistance.

## Implementation

We recommend the City pursue this option as a demonstration/educational project at SEFC, perhaps in combination with a small-scale greenhouse or as part of a restaurant in the Park.

### Land use and site layout

- Allocate some land for this use as a demonstration project;
- Perhaps integrate this use with the demonstration black water treatment project and use tertiary treated waste-water for water supply for this option.

### Zoning

- Commercial/Light industrial zoning at SEFC should be designed to accommodate this use.

### Incentives

- Demonstration project will establish viability of option and the need for incentives.

### Design

- Design aquaculture system to maximize re-use of local wastes from restaurants, community kitchens, food processors etc.

### Education/Programming

- Educate residents about the benefits of aquaculture/biaponics and re-using wastes.

### Other

- There will be concerns from the public health department, which will need to be addressed.

## Case Studies and Precedents

Click on hyperlink or see Appendix B

[The God's Gang Worm and Fish Project](#)



[HPI Project](#)

## 6.11 Option G11 – Micro Livestock

### Description

Livestock in the city is an ‘unmentionable’ that is actually common practice in many parts of the world. Mega-cities [over ten million] such as Mexico city and Cairo report livestock rearing as being more common than fruit and vegetable production as both commercial and hobby urban agriculture. However, here we limit the discussion of livestock to micro-livestock such as bees, and worms that actually play a supporting role to other options. However, other creatures classified as micro-livestock such as mice and pigeons are kept in other cities.

### Benefits

Play a valuable role by pollinating crops in the case of bees, and processing wastes and providing food for fish in the case of worms. Some provide a valuable protein component

### Type and Size of Space Required

Opportunity at SEFC for livestock is very limited because of the high-density nature of residential development. Most livestock prefer open free-range spaces but of course many are kept in very crowded conditions. Micro-Livestock that could be feasible at SEFC are those small, low-nuisance varieties including bees, worms, pigeons and mice.

### How much food could be grown?

Micro-livestock could be raised to produce a significant amount of the protein requirements of the community. However, public perception of most animals in urban spaces will probably restrict this use and severely limit the amount of food produces aside from a small amount of honey for example.

### Challenges

Existing public health regulations (see Appendix A – Policy, Regulations & Guidelines Having a Bearing on Urban Agriculture in Vancouver) prevent the keeping of livestock in the City of Vancouver due to concerns of disease, and odours. In addition, slaughtering is problematic in urban areas where no abattoirs exist.

Public perception is that most livestock are inappropriate in an urban context. The exception may be bees and worms although concerns of insect stings and allergic reactions need to be addressed.

### Cost

Costs associated with this option are highly variable and depend very much on the approach, type of micro-livestock. However, the investment in most micro-livestock operations will be minimal.

### Evaluation

Advantages	Disadvantages
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	Advantages	Disadvantages
Social	Some educational opportunities are involved;	Potential nuisance/odour problems Perception as inappropriate in urban areas
Environmental	Bees can provide important pollination for plants; Micro-livestock wastes can be used to enrich soil; Can process wastes.	
Economic	Small capital investment involved.	May negatively impact adjacent land values unless properly designed and managed.
Other	Unusual approach – may distinguish SEFC as unique community	

## Implementation

While we acknowledge the benefits of livestock and see that this might be appropriate in some urban areas, we do not recommend the keeping of any large or medium size livestock at SEFC because of the type of community. We do, however, recommend that the existing public health bylaw that prevents the keeping of bees be reviewed because bees provide a valuable pollination function without which many plants may not successfully develop.

Worms are of course a vital part of the soil and should be used in composting bins to create fertile compost. They can also be raised as food for aquaculture operations.

## Case Studies and Precedents

[The Heifer Project](#)

[The God's Gang Worm and Fish Project](#)

## 7.0 Food Processing Options

Food processing turns raw food commodities into value-added, products. Various stages of processing can be identified:

- First Stage Processing – single ingredient preserves such as canned tomatoes, pickled cucumbers etc.
- Second Stage Processing – sauces, soups, dips
- Advanced Processing – entrees, breads for retail or food service industry.

As with food production, processing can be done at several scales ranging from in home for personal consumption or sale at a farmers market, at a community scale in a community kitchen and often practised by NGOs, or at a commercial scale. The following options explore various approaches to food processing and value-added production that might reasonably occur at SEFC.

Food Processing Options discussed here include:

- Commercial Food Processing Facility
- Food Training Facility (incubator)
- Eco-industrial Food Complex

## 7.1 Option P1 – Commercial Food Processing Facility

### Description

A commercial processing facility is a large kitchen outfitted with commercial grade exhaust fans, stainless steel sinks and tables, grease traps and an industrial dishwasher. Health regulations stipulate that all processed foods that are sold to the public must be processed in an approved commercial facility.

While shared commercial kitchens exist in other Canadian cities, we are not aware of a shared commercial kitchen in Vancouver. However, a 1000 square foot commercial kitchen (for dedicated use by one tenant) recently began production on Bowen Island. This facility has allocated half of the space for cooking space and the other half for packaging and office area.

A variety of processing options are available to sustainable community scale processors. The primary options include:

- ☐ **Canning or bottling.** This option offers good opportunities for small scale processors because of the long shelf life although there are some significant limitations (e.g. health regulations). Canned or bottled items commonly include spreads, jams, condiments, canned fruits and vegetables, and sauces.
- ☐ **Making mixes.** Dry mixes, such as seasoning packages, soup mixes, falafel mixes and so on, are good options in this category and generally can be processed at a low cost.
- ☐ **"Fresh" processing.** This category includes lightly processed foods that are sold in a fresh, ready-to-eat or ready-to-cook form such as bakery items, prepared salads, packaged greens, fresh pasta and pasta sauces, sandwiches, burritos, and barbecued chickens. Lightly processed fresh vegetables and fruits that have been washed, peeled, and/or sliced would also be considered fresh processed
- ☐ **Baking.** Baking of fresh breads and buns for local community distribution is economically viable and well developed at a community scale. This is essentially a type of "fresh" processing.
- ☐ **Smoking and dehydrating.** This option offers community scale opportunities (e.g. fruit leather, bacon), but only for a narrow product range.

### Type and Size of Space Required

Two types of commercial processing facilities could be developed. The first is a commercial kitchen for small food processors or caterers that have small production runs. The second is for a row of advanced processor commercial units to house processors that are processing year-round on a larger scale. Each type and size of space required is discussed below.

- 1) **Commercial kitchen** – A commercial kitchen could be developed that is about 4000 square feet (modelled after the successful commercial kitchen in Toronto – see case study). About half the area could be devoted to processing/cooking while the other area could be for food break down and packaging. It would be ideal to attract a catering firm that would be the primary tenant until a sufficient number of smaller processors could be attracted. It may also be beneficial to have a retail storefront associated with the kitchen (or at least nearby) to sell the processed foods.

- 2) **Advanced processor rental units** – More advanced processors will need dedicated processing facilities. To accommodate them, five to ten 1,000 square foot processing-ready rental units could be developed with removable concrete block walls between each unit that could be taken down to make larger facilities. All the units would be equipped with exhaust ports, grease traps and plumbing for industrial dishwashing equipment. These units could be used by small coffee shops, if there isn't sufficient demand from processors.

Any commercial-zoned space would be appropriate for this option.

### How much rent could be generated?

Based on the Field to Table commercial kitchen (Foodshare), tenants would pay about \$25 to \$50 per hour to use the facility. Revenues of about \$70,000 per year would likely be needed for the kitchen to break even on its costs. To generate these kinds of revenues, the facility would need to generate 1500 to 3000 billable hours of rental time. It should be possible to achieve this level of utilization with 2 years given that more than one processor could use the facility at the same time and the facility could be used on weekends and evenings. Based on the above utilization, the rent per square foot would be about \$18. Commercial rates in the vicinity of SEFC are about \$12/square foot (including triple net). The extra \$6/square foot would defray most or all of the costs of having a coordinator.

The advanced processing-ready rental units could conceivably pay \$12/square foot without any subsidy but probably not much more. The Bowen Island facility expects to generate food revenues of about \$250,000 per year from their 1000 square foot facility.

### Challenges

The challenge would be to find enough tenants who would pay \$25 to \$50 per hour for enough hours to cover the costs of running the commercial kitchen. As in Toronto, it may be possible for the City or another government agency to subsidize the kitchen until it reaches good capacity.

Another challenge is that processors can process foods in a way that is cost competitive for the processor and still price competitive for the consumer so long as the volumes are small. However, as soon as the volume increases to the point where the processor has to hire staff and purchase expensive equipment it is no longer economic until the processor reaches a much larger volume. Processors should be made aware of this profitability loss phenomenon at medium processing volumes.

A commercial kitchen coordinator will likely need to be hired to manage the processors and maximize the use of the space. This position may need to be subsidized in the beginning.

### Evaluation

	Advantages	Disadvantages
Social	Shared commercial kitchens can be used as training facilities and therefore take on the role of a training facility/incubator for new processors who need help with business planning, food processing techniques and	If the facility is not properly managed there is a risk of foul odours from rotting food, and possible rodent problems.

	<p>meeting health regulations (see Food Incubators in the next section).</p> <p>The availability of a commercial kitchen provides an opportunity for those involved in food production at SEFC to process their crop into a higher-value product.</p>	
Environmental	<p>To the extent that the processors use culls (crop discards) from the food production activities, they can provide a waste reduction benefit. Also, the fact that the food producers can process their crops on site, instead of having to ship them to a far away processor, they save on transportation-related fuel impacts.</p>	<p>Food processing may involve the use of large amounts of potable water for washing produce and cleaning surfaces. This may, therefore, increase the water consumption in the community.</p>
Economic	<p>Many small food processors do not have sufficient processing volume to justify renting a commercial kitchen for their exclusive use. However, by renting a shared commercial kitchen on an hourly, daily or weekly rental basis, they can do their processing at a much more affordable cost.</p> <p>A key characteristic common to community level food processing activities is "<b>income patching</b>," where the processing activity is one of several sources of income rather than the processor's sole source of support. These types of processing activities are generally a part time activity; involve hand crafted, home made quality products; and take place either on-farm, in borrowed approved kitchens, such as schools or churches, or possibly in community food kitchens. These activities generally have very low overhead and fixed costs, thereby maximizing net cash returns to the farmer/processor. The total income is limited, however, by low volume output and small markets. For example, researchers have shown that two people working for three days making apple sauce from 36 cases of apples, can earn the equivalent of 45 days of wages as a retail store clerk (Integrity systems Cooperative Co.,1997).</p>	<p>If the City decides to support and invest in such an initiative, there will be a cost of doing so. The City of Toronto supports a shared commercial kitchen to the tune of \$70,000 per year. Finding tenants to pay high enough rents.</p>
Other	<p>If the commercial kitchen is not successful, the space can easily be allocated to another</p>	

	commercial tenant. This option is highly transferable to other communities in Vancouver and beyond.	
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## Implementation

We recommend that both types of processing facilities be encouraged in buildings that are zoned commercial or mixed residential/commercial at SEFC.

As much as possible, both types of processing facilities should be designed with maximum flexibility, both in terms of expanding or shrinking the floor space as well as in terms of the types of processing equipment installed. In general, very little specialized equipment should be installed.

A 500 to 1000 square foot walk in cooler and a 100 to 200 square foot walk in freezer will need to be constructed within or adjacent to the food incubator area. Energy costs will be greatly reduced if many different tenants use the same cooler (although this creates potential problems of food theft). It may be desirable to allow sufficient space for a small 500 square foot retail outlet for on-site sales.

The following implementation tools could be used by the City to foster the creation of a commercial kitchen.

### Land Use and Site Layout

- Can be located in any commercial zone or as part of a public building.

### Zoning

- Residential buildings could be zoned to allow commercial activities on the ground floor.
- City owned buildings could also be zoned for commercial use. This would expand the range of possible locations for a commercial kitchen.

### Design

- Include vents for fume hoods, proper plumbing and drainage, and 220-volt power supply or natural gas lines for stoves.

### City investment

- The city could subsidize the costs of the kitchen until it was able to generate sufficient revenues to cover full commercial rental rates as well as the cost of a coordinator. It is possible that eventually a commercial kitchen could be viable without any City support.
- On a larger scale, the city could invest in a multi-faceted food system resource centre which would house the administration offices of The Good Food Box, US Moms, the Farmers Market, Farm Folk City Folk, Community Kitchens, and so on. The commercial kitchen would just be one facet of this resource centre.

### Programming

- The city could market the commercial kitchen to ensure that it is widely used by SEFC residents and other food processors.



## **Case Studies and Precedents**

Click on hyperlink or see Appendix B

[Field to Table Commercial kitchen in Toronto](#)

## 7.2 Option P2 – Food Training Facility (Incubator)

### Description

A food incubator is a training facility where food growers, processors and retailers can get technical or management assistance to improve their business success. Incubators also help growers and processors join together to form marketing cooperatives or to share in the cost of purchasing supplies and equipment.

### Type and Size of Space Required

Food training facilities typically need access to a commercial kitchen or a high school kitchen with a full range of cooking facilities and equipment. It would be quite feasible (and probably desirable) to use the commercial kitchen described in the previous option. A minimum of 1000 square feet of commercial-zoned space would be required. The packaging area of the commercial kitchen could be converted into a lecture space when food packaging is not occurring.

### What kind of fees could be generated?

It would be difficult to generate sufficient fees to fully cover the costs of the facility because growers or processors who are just starting out don't have sufficient financial resources to pay for training at full rates even though this is when they need it most. However, after a couple of years, once the facility has become better established, it should be possible to cover the costs of one full time training coordinator and fees for a limited number of specialists.

A range of programs could be offered to various audiences with the following potential revenues (assuming the programs were offered at 30% below market pricing):

Type of Service	Audience	Total Revenue
Counselling on how to set up a commercial processing business	Entrepreneurs	60/year at \$500/entrepreneur = \$30,000
Administration support (e.g. book-keeping, financial advice, payroll administration, etc.)	Entrepreneurs	10/year at \$2,000/entrepreneur = \$20,000
Training and education (e.g. food safe certification)	Entrepreneurs and students	100/year at \$100/student = \$10,000
Cooking/food education classes	Residents	500/year at \$20/resident = \$10,000

### Challenges

The primary challenge will be to find initial funding to launch the facility. If structured properly, it should be possible for the facility to cover its costs in the long term, once significant quantities of foods are being grown and processed. The City of Toronto Economic Development Commission funds the Food Share incubator kitchen \$70,000 per year as a job creation strategy.

## Evaluation

	Advantages	Disadvantages
Social	<p>Given that one of the objectives of urban agriculture is to involve as many people as possible in growing, processing and distribution of food, it is important that they have easy access to training and information about food processing. A food incubator can provide the following types of assistance:</p> <ul style="list-style-type: none"> <li>• Technical training on how to grow, process, and distribute various kinds of foods.</li> <li>• Help in certifying growers and processors to meet health regulations and/or organic standards</li> <li>• Technical training to certify organic processing and production inspectors.</li> <li>• Business management advice, including potential sharing of accounting/administration costs.</li> <li>• Financing support, including debt and/or equity financing</li> <li>• Educating consumers to stimulate demand for locally grown/processed foods.</li> </ul> <p>An incubator provides an excellent opportunity to foster interaction and cooperation among the individuals that are participating in all levels of the food systems (production, processing, distribution and consumption).</p>	None
Environmental	The availability of an on-site education/training facility means that food processors will not have to travel to other locations to be trained, which will potentially reduce transportation-related environmental impacts.	None
Economic	If the incubator is run out of the commercial kitchen, the costs for the use of the space should be significantly below market rates. Furthermore, the ability to offer group training to on-site growers and processors should reduce overall training costs. Finally, the incubator is a	Costs of initial investment and on-going financial support (perhaps \$70,000).

	direct job creation initiative, which should boost the local economy.	
Other	This option may be a good model for other parts of the City and is highly transferable to other communities in Vancouver and beyond.	

## Implementation

We recommend that a food training facility be established on the site in conjunction with the commercial kitchen discussed in the previous option.

The most successful implementation model would likely be to partner with an educational institution (e.g. BCIT) and to charge the participants a small membership fee and a percentage of their revenues. A percentage of the hourly rental charge for processors could also go to cover the costs of the facility.

Growers and processors should be encouraged to share their experience and learning so that over time a bank of knowledge is built up for new growers and processors.

The ways in which the city could support a food incubator on the site include the following:

### Zoning

- The city should ensure that the zoning allows for educational/training activities within a space that is zoned for commercial use.
- Residential buildings and public buildings could be zoned to allow this activity on their premises.

### Design

- Facility requires appropriate ventilation, plumbing, power supply, and convenient public access.
- Commercial spaces often restrict high-density public access.

### City investment

- The city could subsidize the costs of the facility until it was able to generate sufficient revenues to cover its costs. A grant of \$100,000 spread over 3 years (\$50,000 first year, \$30,000 second year, \$20,000 third year) would likely be sufficient.

### Programming

- The city could provide information to SEFC residents about the incubator to increase participation.

### Education

- This is primarily an educational initiative.

## Case Studies and Precedents

None included

## 7.3 Option P3 – Eco-industrial Complex for Food Processing

### Description

An eco-industrial complex (EIC) is a multi-tenant building in which a number of symbiotic enterprises are situated together such that the wastes and outputs of some enterprises can be used as inputs to other enterprises. It is formally defined as:

***“... a community of manufacturing and service businesses seeking enhanced environmental and economic performance through collaboration in managing environmental and resource issues including energy, water, and materials.... The goal is to improve the economic performance of the participating companies while minimizing their environmental impact. Components of this approach include new or retrofitted design of park infrastructure and plants; pollution prevention; energy efficiency; and inter-company partnering.” (Lowe,1997)***

At a simple level, food wastes from food processing or food-retailing operations could be used as fertilizer for food production activities. At an advanced level, aquatic tanks have been used to convert food waste into high-nutrient feedstock for fish production and nutrients for hydroponic vegetable crops. The tanks are arranged in a series to create a biologically diverse ecosystem.

### Benefits

The main benefit of an EIC is the ability to manage wastes in an ecologically sound manner while increasing profitability of the businesses involved. An EIC is a novel approach to food and waste management and, as such, would represent an interesting research and education opportunity for the City. Including such a system at SEFC would demonstrate a willingness to experiment with new approaches to sustainability.

### Type and Size of Space Required

Full scale eco-industrial parks are typically 100 to 200 acres in size (Lowe, 1997) however, it is possible to exhibit some aspects of waste recovery at many different scales. A demonstration of a nutrient recycling aquatic tank system would require as little as 4000 square feet, which could be situated along a semi-enclosed right of way because it is essentially a series of tanks. Such a facility could treat 6,000 to 10,000 gallons of sewage or food production waste each day. Food production facilities that have built this kind of system include:

- Cedar Grove Cheese Company (Wisconsin)
- Kal Kan Pet Food (California)
- Ethel Chocolates (Nevada)
- Mars Inc. (Brazil)
- EFFEM Productos Alimenticios (Brazil)
- Master Foods (Australia)<sup>21</sup>

<sup>21</sup> Source: [www.livingmachines.com](http://www.livingmachines.com)

## What kind of money could be saved or generated?

The amount of money that could be generated is largely dependent on the size and nature of the eco-industrial complex. If an advanced complex is selected, there could be significant tourism revenues because many people will want to visit the complex. This is the case with the Village of Bear River Nova Scotia that uses a greenhouse-based living machine to treat local sewage. The greenhouse has become a tourist attraction in its own right.

## Challenges

Implementing an eco-industrial park requires a high degree of knowledge to develop. Even with this knowledge, a significant amount of research would have to be conducted to identify optimal tenants to co-locate on the site.

Consultants will need to be hired to develop and implement the system. It may be difficult to convince a developer that this type of complex is feasible in a high-density development such as SEFC.

## Evaluation

	Advantages	Disadvantages
Social	An innovative waste recovery and food production system such as the one described above has the potential to significantly increase awareness about wastewater and recycling. A demonstration project will provide excellent opportunities to be a “living classroom” in which visitors and students can learn about the environment, agriculture and sustainable technologies.	Risk of odours if improperly designed/managed.
Environmental	Significant quantities of wastes are diverted from landfill (thereby reducing waste management costs) and used as a feedstock in other processes (thereby reducing raw material costs and overall environmental impact). Transfer of energy is another significant benefit.	Risk of incomplete treatment due to novel technology.
Economic	An eco-industrial complex has the potential to save participating companies money and to provide economic development opportunities for Vancouver if it attracts companies and visitors to Vancouver to view (and potentially purchase) the technologies used in the complex.	Option requires public investment as a demonstration project. Costs are not known Requires a cost feasibility study. May require different businesses to rely on each other.
Other	Innovative project – furthers sustainability research knowledge.	

## **Implementation**

Because very little of SEFC is zoned industrial, it is not feasible to attempt a full-scale eco-industrial complex (this might be more appropriate at False Creek Flats). However, we recommend that a demonstration project be implemented to demonstrate the concept of Eco-Industrial Networking, which might be transferable to other parts of the City.

In particular, we recommend that a functioning Living Machine be established that is modelled after the Riverside Eco-Park being developed in Burlington, Vermont (see case study Appendix B). We also recommend that all food wastes (excess food) generated on the site be divided into two groups: those that are still fit for human consumption, and those that can be used for composting. Finally, we recommend that attempts be made to recover waste heat from one operation and used by another operation (commercial food-processing operations typically generate significant amounts of waste heat from the heating and cooling equipment).

The City of Vancouver could support this option in the following ways.

### **Land use and site layout**

- Allocate a small parcel of public land (say 4000 square feet) where a functioning living machine could be built and demonstrated. It could even be incorporated into a park-style space in which the tanks are set in the ground like Koi ponds in a Japanese garden with benches and greenery around.
- Another small parcel of land could be allocated for composting activities, although ideally it would be best to have composters at each food production site.

### **Zoning**

- A special zoning may have to be developed to accommodate the construction of a living machine.

### **Regulatory Reform**

- Changes will likely need to be requested as a living machine contravenes the existing building code and health bylaw for sewage treatment. In all areas, design guidelines should be amended to provide a minimum area for recycling and composting.

### **City investment**

- The City will need to pay for the construction of a living machine but should not have to pay any more than it would pay for a conventional wastewater treatment option. In fact, it is likely that the city's wastewater treatment costs will be reduced by this option. Similarly, providing strong encouragement for composting will reduce waste disposal costs as organic matter makes up 30% of the waste stream by volume.

### **Programming and education**

- The City could do a full-scale education campaign around living machines. It may even be possible to generate tourism revenues as many people will want to see how the system operates. The City should also do education programs on the benefits of recycling and composting.

## **Case Studies and Precedents**

Click on hyperlink or see Appendix B

[Riverside Eco-Park in Burlington, Vermont](#)

Also see aquaculture and bioponics option.



## 8.0 Food Distribution Options

Possible food distribution and retailing opportunities discussed in this section include:

- Farmers markets – permanent, occasional
- Direct Home Delivery (private, non-profit)
- Grocery stores
- Food buying clubs and Community Shared Agriculture (CSA)
- Emergency Food Services

## 8.1 Option D1 – Farmers Market

### Description

Farmers markets are typically held on one day of the week during the harvest season. They are almost all operated on a co-operative basis, whereby the growers pay a small rental fee to have a market stall where they can sell their products. The markets typically exclude organizations that are not growers or direct processors of locally grown products.

There are 12 farmers markets in the lower mainland. In Vancouver, there are two farmers markets, the West End farmers market and East Vancouver farmers market. The East Vancouver farmers market is much more well established and generates about \$800,000 in revenues per year (\$50,000 per day). Broadly defined, some areas of the Granville Island public market could also be considered farmers markets, although they operate seven days per week year round and sell much more than crops.

According to a USDA National Farmers Market Survey, about 80% of farmers markets in the United States are financially self-sufficient.

### Type and size of space required

There are two possible approaches for farmers markets at SEFC: 1) conduct a farmers market once per week during the harvest season, or 2) conduct a farmers market seven days per week year round. Both approaches are briefly discussed below.

- 1) **Farmers market one day per week during harvest season** – An area of 4000 to 8000 square feet (1 to 2 times the size of the East Vancouver farmers market) would be needed each week at a nominal cost, so that vendors could set up 10 foot by 10 foot stalls on Saturdays from 9:00 AM to 1:00 PM from July to October. The market could be conducted in an open area but preferably it would be a covered space so that weather was not a factor. The most ideal space would be a ground floor space in which the outer walls were barn-style doors that could be opened for easy access by farm vehicles.
- 2) **Farmers market held every day year round** – Modelled after the highly successful Granville Island Public Market or London (Ontario) new Covent Garden Market, a farmers market could be established in an indoor market area (possibly the existing heritage building). As at Granville Island where there are 50 permanent vendors, many different vendors could establish permanent stalls. Ideally, this market would differentiate itself from the Granville Island market by promoting foods that are: organic; heritage varieties; unusual (e.g. lemon cucumbers), fairly traded, and so on. Covent Garden Market also features an outdoor public plaza where an outdoor farmer's market is held twice a week as well as outdoor recreational events such as hockey and ice-skating in the winter months.

### How much food could be purchased?

#### One day a week market

Under the first approach above, perhaps about 5% of the households (about 250) would go to the market, making an average purchase of about \$20 (\$5,000 total for the day). Assuming that the East Vancouver

farmers market and the west end farmers market were moved to this location, they would generate about \$10,000 per day in revenues. Annually this would work out to about \$1 million revenues per year (\$1.5 million if the market was open both weekend days).

### **Permanent market**

The second approach would generate much higher revenues, both from SEFC residents and from outsiders. Given that a typical retail store generates \$800 per square foot, a public market with a much more limited selection and less space efficient layout would likely generate half that amount per square foot. Therefore, an 8,000 square foot market would generate \$4 million per year. It is reasonable to assume that about 25% of the SEFC households would shop at the market each week and make an average \$25 purchase. This would generate revenues of \$2 million.

## **Challenges**

### **One day a week market**

The biggest challenge is that the market could not pay anything close to commercial rates for the space. Further, it may be difficult to find an appropriate site that will not compete with other site uses. The best way to overcome these challenges is to locate the market in a multi-use facility that is used for fairs, festivals, concerts, and other gatherings during the times when the market is not open.

If the market is held outdoors, there may be some challenges due to a lack of on-site refrigeration and a lack of power supply (although these problems have been overcome with portable generators and refrigeration units at the existing farmers markets).

Another challenge currently faced by the existing farmers markets is that they have no long term tenure on the space they use. This could be overcome by providing a five-year commitment to the market so that farmers have guaranteed space.

Finally, if SEFC residents are allowed to sell their products at the market, care must be taken to ensure that they do not severely undercut the prices of the farmers, for whom the market is a primary source of income.

### **Permanent market**

A permanent market might become so popular that traffic problems might arise (as is currently experienced by Granville Island). The permanent market may also need to have subsidized rents.

A permanent market may compete (actual or perceived) with Granville Island Market for business. Care should be taken to distinguish the two markets so they are not competing for customers.

## **Evaluation**

	<b>Advantages</b>	<b>Disadvantages</b>
Social	<p>A permanent home for the farmers market would provide a significant degree of security for the farmers who participate in the market.</p> <p>SEFC residents would gain easy access to</p>	None

	Advantages	Disadvantages
	<p>very locally produced food and be able to develop direct relationships with the people who are growing them. Farmers markets have a certain social cachet and tend to draw people to them just for the experience. Farmers markets also play an educational role and often feature displays of information related to food and farming. A permanent farmers market could also be the keystone for a series of community food celebrations throughout the year.</p>	
Environmental	<p>Most of the farmers who attend the farmers market sell organic food, which has distinct environmental benefits. Further, because the food is produced locally (some of it on-site) and sold locally, the transportation-related environmental impacts of shipping the product to market are reduced as is the need for residents to travel off-site.</p>	None.
Economic	<p>A farmers market provides a venue for food producers or processors to sell their products at retail prices instead of selling wholesale to a retail store. Gross returns from farmers' market sales are typically 200% to 250% higher than from wholesale fresh market sales (Integrity Systems Cooperative Co., 1997). Because most farmers markets use a vacant parking lot or other unused space, the space rental costs are typically very low. As such, farmers markets significantly improve the economic viability of small scale growers/processors.</p> <p>Non-commercial/semi-commercial growers could supplement their income (income patching) by selling small amounts of food on a periodic basis. This opportunity in itself would provide an incentive for backyard/balcony/rooftop gardeners to grow food at SEFC.</p>	<p>Cost to City of providing an open space (for temporary farmers market) or indoor space for permanent farmers market.</p> <p>May compete directly with Granville Island Public Market for customers.</p>

## **Implementation**

We recommend that a weekend farmers market be established in a ground floor indoor (or outdoor) multipurpose space with easy loading and unloading access. We further recommend that an adjacent or separate space be allocated for a number of permanent market stalls, some of which could be used by the onsite processors and/or growers. Provided that care was taken to attract tenants that sold locally sourced (including on-site), environmentally friendly and fairly traded products, the market could make a significant contribution to the sustainability of the site. This approach, and a focus on heritage or other unusual/specialty food varieties could also be used to distinguish this market from the Granville Island Market. In addition, we recommend that parking be very restricted so that this market attracts either local residents or transit users only. For this reason, the market should be located as close to the SkyTrain station as possible, perhaps with a shuttle service offered.

For the on-site growers/processors, it will likely be desirable to establish a cooperative that would market the products grown and processed on-site at the market. The growers and processors could pay for the cooperative. The cooperative would provide a number of valuable services to the growers/processors, including:

- Ensuring consistent quality
- Coordinating demand so that the right amount of product is available at the market.
- Assisting with proper merchandising techniques.

Farmers market vendors either pay a flat daily rate for the use of a 10' by 10' stall (this is the way it is done in Vancouver) or a percentage of revenues (the average is 6%). Nina Planck, a farm market organizer in UK and the USA, suggests these seven principles for success<sup>22</sup>:

1. Flat space, farmers on the periphery and customers in the centre,
2. Parking nearby,
3. Electrical outlets,
4. Good signage [permanent and daily],
5. Benches for seating,
6. Running water, cleanliness of all, and
7. Secure lock-up

Farmers markets launched and managed in partnership with schools, churches, sports clubs, bureaucratic office complexes, and hospitals have had considerable success. The League of Women Voters and others have found that by-and-large food shoppers are happy to pay 10% more at a farmers market. Considering a new community the market might well consider generating its own label and holding classes in cooking, nutrition, flower-arranging and the like.

Ways in which the City could foster a farmers market include:

## **Zoning**

- Provide for a multipurpose space as part of the zoning which would allow for festivals, food fairs, craft fairs, as well as a farmers market.

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<sup>22</sup> Nina Planck [planckn@earthlink.net](mailto:planckn@earthlink.net)

### **Design guidelines**

- Create design guidelines that would foster a ground floor space that could be opened up with barn-style doors. If the market is to be outside, build special features in to the guidelines that would allow for running water, electrical outlets, secure lock-up and so on.

### **City Investment**

- The city should invest in this option by providing sufficient space to house a farmers market at a very nominal rent.

### **Programming**

- The City could help to promote the market by including it as a formal part of the City run activities on the site.

### **Case Studies & Precedents**

Click on hyperlink or see Appendix B

[East Vancouver Farmers Market](#)

[Covent Garden Market, London, ON](#)

## 8.2 Option D2 – Direct Home Delivery

### Description

Direct home delivery involves delivering food to residential homes (or apartments) that has been ordered by phone or on-line. Food home delivery firms can be either non-profit or for profit. The non-profit organisations are typically Community Shared Agriculture (CSA) operations, in which the customer pays a set fee per month to receive a weekly basket of seasonally available produce from one or a few local farms. For-profit operations typically give the customer a much wider range of products that may or may not be sourced locally.

The estimated number of direct home delivery organisations in Vancouver is shown below:

Type of organisation	Number of firms	Households served each week
Community Shared Agriculture (CSA)	3 to 5	Less than 500
Direct home delivery of conventional groceries	5 to 7	About 3000
Direct home delivery of organic produce and whole foods	6 to 8	About 4000

**Source:** Proprietary market research data from Small Potatoes Urban Delivery Inc.

The primary reasons that people get their groceries delivered is so that they can avoid the time, expense, hassle, and pollution of making a shopping trip (typically using a car).

### Benefits

Home delivery of food reduces the need for residents to make grocery shopping trips. In addition, many of the companies and organizations involved have an ethical angle to their purchasing, often based on organic/fair trade food, and the support of local farmers.

### Type and size of space required

There are two approaches for direct home delivery: 1) establish an on-site home delivery firm, or 2) foster the use of existing home delivery firms that foster local purchases. Both approaches are briefly discussed below.

- 1) Establish an existing home delivery firm to serve residents of SEFC** – While home delivery is rapidly becoming more popular, probably only 5% of households would subscribe to such a service. This would create a market of only 250 households, which would only create employment for 3 people working out of a 1000 square foot commercial space.
- 2) Encourage the use of existing delivery firms** – Residents could be made aware of and encouraged to use existing direct home delivery firms that try to buy from local suppliers wherever possible. Such firms could improve the viability of SEFC food producers by adding their products to their product catalogues. No space would be required for this direct home delivery approach.

## How much food could be purchased?

It would be reasonable to assume that up to 5% of households would use the service and would spend an average of \$70 per week. This would add up to \$1 million in purchases per year.

In another five years, once home delivery becomes more popular and such firms offer more products, it should be feasible to see SEFC residents purchasing over \$2 million in home delivery groceries and other products.

## Challenges

The viability of a direct home delivery operation established on site would depend heavily on the range of products offered and the quality of the service provided. Over the past five years, almost half of the direct home delivery services have gone bankrupt or been bought by competitors, indicating that it is an economically challenging business at low volumes. The business could not support commercial lease rates exceeding \$7 per square foot (including triple net). This is probably well below the market rate for commercial space at this site.

There would be no challenges in using existing direct home delivery services to serve SEFC residents.

On the supply side, it may be challenging for a direct home delivery firm to buy from SEFC growers or processors if they cannot provide sufficient quantities of the product at a consistent quality and on an agreeable production schedule.

## Evaluation

	Advantages	Disadvantages
Social	75% percent of North Americans indicate that they do not like grocery shopping. By having their groceries delivered (often at no extra cost than what they would pay at their local store), they have more free time to spend with their friends and loved ones, or engaging in life pursuits that are more fulfilling than grocery shopping.	Less social interaction while shopping
Environmental	A typical grocery delivery vehicle can make 80 deliveries on a single route, which reduces traffic congestions and transportation-related pollution from the 80 cars that aren't driven to the grocery store and back. One delivery company even does some of its deliveries by bicycle, further reducing environmental impacts. Further, depending on the delivery service used, consumers can buy much more locally than they would at an average grocery store. For example, an average	None



	Advantages	Disadvantages
	grocery store item travels 2500 kilometres from where it is produced to where it is sold. By comparison, an average item sold by the largest home delivery firm (Small Potatoes Urban Delivery) travels only 750 kilometres.	
Economic	Direct home delivery is economically viable in Vancouver (in most cases, the consumer does not pay any more to have their groceries home delivered than to buy the same items at the store).	Decreased viability of commercial retail areas. Competition with other food outlets.
Other	Direct Home Delivery Companies often combine educational leaflets with the delivery helping to educate consumers about organic food and farming.  Direct home delivery firms have the added benefit of being able to better channel their purchases and therefore could facilitate selling the products grown or processed at SEFC to SEFC residents.	None

## Implementation

There is not sufficient justification to establish an on-site direct home delivery firm. Therefore, we recommend that residents be made aware of, and encouraged to use an existing direct home delivery service. The only way in which the city would need to foster this food option would be through programming and education.

## Programming and education

If it is within the jurisdiction of the City to require a developer to establish an intranet site for SEFC residents, they should do so. Otherwise, the City should strongly encourage it as it will have many other benefits. If an intranet site was developed for SEFC residents, it could easily be used to promote this type of service. Based on the current practices of home delivery firms, such firms would likely offer \$25 off the first order to all SEFC residents that tried the service. A number of them would also give each SEFC resident a \$10 to \$25 rebate off future grocery orders for referring another SEFC resident who subsequently tries the service.

One other way that the city could help would be to mandate that property owners provide access to home delivery firms who are making deliveries. Delivery firms would be granted access into the building so that they could drop the delivery off at the doorsteps of their customers.

## **Case Studies and Precedents**

Small Potatoes Urban Delivery (SPUDS)

## **8.3 Option D3 – Food Buying Clubs**

### **Description**

Food buying clubs involve a group of consumers coming together and pooling their food purchases to generate large enough orders to deal directly with food distributors or even growers. These are typically informal arrangements as opposed to larger consumer food cooperatives. While the majority of the items purchased are generally bulk or process foods with a long shelf life, fresh fruits and vegetables can also be included.

The growers or distributors typically drop off the groceries in case lot amounts at a single location. The club then relies on the volunteer efforts of its members to divide up the food to the participants.

A food buying club could easily be established at SEFC as there are few barriers and no regulatory impediments to operating a food buying club. It is particularly appropriate for the low-income residents who may have more time availability but less financial resources.

There are three major distributors who are involved in supplying buying clubs with wholesome groceries:

- Horizon Distributors (primarily bulk and packaged foods with a long shelf life)
- Wild West Organic Harvest (a mix of produce and grocery items)
- ProOrganics Marketing Inc. (primarily produce)

### **Benefits**

Food buying clubs allow consumers purchase food in bulk which results in cost savings. Purchasers can also pool their buying power to support local farms and farmers or suppliers with an ethical dimension. There are also social interactions and relationships that develop between participants. In addition, the amount of food transportation is reduced because food is transported more directly to the customer.

### **Type and size of space required**

Technically speaking, a buyer's club could be operated out of one resident's living space. Practically speaking, however, it would be desirable to have a 500 to 1000 square foot space where the cases of food could be dropped off and then divided up among the participants.

### **How much food could be purchased?**

Assuming that 50 households (1% of households) made an average purchase of \$100 through the buying club once a month, the total annual purchase through the buying club would be \$60,000.

### **Challenges**

The success of food buying clubs depends greatly on the willingness and availability of the members to do their fair share of work in dividing up the food when it arrives. There is also a fair amount of work and coordination to receive all the orders from the participants and then submit an order to the food distributor

or grower. Many food buying clubs fail because the participants find that the work involved (especially when some of the participants don't pull their weight) is not worth the savings.

## Evaluation

	Advantages	Disadvantages
Social	A key benefit of food buying clubs is the social interactions and enhanced community relationships that are developed.	Required dedication of time and organizing effort on part of participants.
Environmental	By buying directly from a distributor, the environmental impacts of transporting the food from the distributor to the retailer and then from the retailer to the consumer are greatly reduced.	None
Economic	Food buying club participants typically save about 15 to 25% on the price of the groceries they purchase.	Competition with retail outlets

## Implementation

We recommend that the residents be made aware of local food distributors that are willing to serve buying clubs. If an incubator commercial kitchen was established, it may be appropriate to use this facility to drop off the groceries and subsequently to divide up the groceries.

Implementation strategies that could be used by the city to support this option include:

### Design

It is desirable to have a suitable location where the growers/distributors can drop off their products and where the buying club participants can divide up the bulk order into individual buying club member allotments. The City could stipulate that such a space be included in the main residential buildings.

### Programming

The City could educate the residents about buying clubs and specific food distributors that serve buying clubs. The intranet would be useful for this purpose.

## Case Studies and Precedents

None included.

## 8.4 Option D4 – Grocery store

### Description

From a size and management perspective, there are four major types of grocery store: an independent grocery store, a grocery coop, a chain grocery store and a superstore. From a product standpoint, there are two types: a conventional grocery store and a natural foods store.

### Benefits

Most residents of Vancouver purchase food at a grocery store. If a grocery store is not available locally, food access for residents can be difficult, time-consuming and costly especially for low-income people.

Locating a grocery store in the neighbourhood means that many people may choose not to drive to collect groceries.

### Type and size of Space Required

Because there are no grocery stores adjacent to the site, there would need to be a moderate sized grocery store to meet the needs of the SEFC residents and those living near the site. A moderate sized grocery store is typically about 24,000 square feet.

### How much food could be purchased?

A typical grocery store generates \$600 to \$800 per square foot. A 24,000 square foot store could therefore generate annual revenues of \$15 to \$20 million.

### Challenges

The primary drawback of a grocery store is that the purchasing decisions are often made at a distant location and tend to favour large supply sources that are easier to manage. For example, most of the purchasing decisions for Safeway Canada are made in California, making it difficult for a local store to promote local produce. Further, if the head office is located elsewhere, the profits don't stay in the local community.

Even for an independent grocery store, SEFC growers and processors depend on the willingness of the purchasing manager to sell their product. This problem is reduced with coops because the growers and processors can join the coop and then have more of a voice over what products are carried.

A grocery store has the potential to bring in a significant number of shoppers, most of whom will require parking space for their cars.

Grocery store will also compete with other small-scale suppliers of food and any farmers/public market.

### Evaluation

Advantages	Disadvantages
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Advantages		Disadvantages
Social	The primary benefit of a grocery store is that it typically offers the full range of groceries under one roof. This permits one-stop shopping as opposed to going to a different store for each category of food.	Reduces viability of smaller stores, small – scale growers and micro-processors. Lacking in cultural vitality.
Environmental	Efficiencies of scale may mean reduced energy and material consumption but depends on company policies.  One stop shopping may limit number of car trips.	Compared with farmers markets and Granville Island style markets, conventional grocery stores typically have a negative environmental impact because many of their products are shipped huge distances to reach their location. Large requirement for parking area.
Economic	Grocery stores have large economies of scale and can out-compete smaller market outlets on certain types of products	Concentrates ownership Profits is not re-circulated in local community. Lost potential for income multiplication.

## Implementation

We recommend that the city encourage the development of a grocery store that would be of sufficient size to serve the residents of SEFC and the adjoining areas. The store should be situated adjacent to a Granville Island style multi-tenant market that would offer local foods.

From a sustainability perspective we favour an independent grocery store such as a grocery co-op that emphasizes local and organic food options. Ways in which the city could support this food option, include:

### Land Use/Site Layout

Suitably large area for commercial purposes located near to transit.

### Zoning

A sufficiently large commercial area would have to be zoned to accommodate a grocery store.

### Design

The design guidelines will need to take into consideration things like public access and parking for both SEFC resident shoppers as well as outside shoppers. By maximizing alternative transportation options, such as the tram from Granville Island or even a park and ride, many of the negative impacts of a large grocery store could be reduced.

Dock level loading and space for recycling/composting are examples of other design guideline considerations.

### Partnership

It may be possible to negotiate agreements whereby the grocery store sells locally processed items.

## **Case Studies and Precedents**

None included

## 8.5 Option D5 – Emergency Food Services

### Description

Emergency Food Services include Food Banks, Soup Kitchens and other types of food services to assist people who cannot afford to buy enough healthy food to meet their needs. The most likely foods that would be donated would be excess food generated and donated by growers, processors and food retailers on the site. There are two levels of emergency food services that could be provided at SEFC:

**Food collection:** This involves allocating space to collect foods that are good enough for human consumption but not good enough to be sold in a retail environment. Since the majority of these items will be perishable, they will need to be stored in a cooler or multiple coolers until they can be collected.

**Food preparation and distribution:** This involves allocating space to cook the collected foods and dispense them in a semi or fully-prepared form to those in need.

### Benefits

Emergency food and meal services address social sustainability issues. They provide an essential service for low-income residents and the homeless. In addition, they are also a way of using excess (good quality) food that might otherwise go to waste.

### Type and size of space required

**Collection:** If 3% of the floor space in each on-site cooler were allocated for the collection and storage of foods allocated for donations, there would be ample storage capacity. Most food retailing organizations allocate this amount of space for donations as an integral part of their community donations program.

**Food preparation and distribution:** The donated foods could potentially be prepared in the commercial kitchen. A cafeteria (1000 to 4000 square feet) would be required to host the recipients of the meals.

### How much food could be donated?

Presuming that there are at least \$20 million in retail food sales on the site, there will be at least 5% food excess that is of good quality to be donated to local residents who might need it. There will be additional excess food from growers and processors (although the amounts are highly dependent on the types of food grown or processed).

Based on the above, it is likely that about \$200,000 worth of nutritious food would be available to be donated to low-income residents. If 5% of the 5000 households needed food assistance, there would be \$800 per year available to each of these households. This works out to \$15 per week.



## Challenges

The primary challenge would be the logistics of receiving donated foods from the various growers, processors, and distributors as well as the logistics of distributing the donated foods to those in need of them.

There is also the question of whether SEFC is an appropriate location for locating emergency meal services or soup kitchens. On one level, all communities have a responsibility to address the issue of hunger and inadequate nutrition amongst the low-income community. One may argue that because the demand for these services in a higher end neighbourhood would be low, it would be more effective to place such services closer to where they are required. In addition, some may argue that such visible services for the poor may generate user conflict, lower land values and reduce business lease rates.

On the other hand, locating these types of services only in poorer neighbourhoods serves to reinforce the ghettoization of the poor and there is a good for all neighbourhoods to equally share responsibility for locating social programs.

## Evaluation

	Advantages	Disadvantages
Social	Emergency food services primarily address social sustainability objectives of food security. Ensures that everyone at SEFC has access to enough nutritious food to meet their dietary needs. This in turn may alleviate problems with poor health, hunger, and attention deficit disorder. A formal coordinated effort to collect nutritious food will also benefit other off-site disadvantaged individuals that could be the recipients of this food.	May generate land use conflicts
Environmental	By donating excess foods, they are potentially kept out of the waste stream.	None
Economic	Emergency food services help reduce the living costs for disadvantaged individuals.	The City or NGO needs to support these types of services.

## Implementation

We recommend that excess food that is safe and healthy to eat be contributed to a food donation centre to assist low-income SEFC residents. The Vancouver Food Bank and Food Runners should be invited to participate in this program.

Excess food from growers, processors and retailers could be dropped off at one or more on-site locations with cold storage availability and then at a scheduled time, food outreach organizations and/or residents could come and receive food. Residents could be invited to pay on a donation basis, such that the costs of the food distribution centre could be partially recouped.

As stated previously, the issue of whether or not to locate emergency meal programs (such as soup kitchens) is a highly politicized decision. If emergency meal programs are to be encouraged, these should be designed to fit into the character of the neighbourhood and reduce user group conflict.

**Design**

It may be necessary to stipulate that there be at least a minimum amount of cooler space for the food production areas to ensure that there is a space to store excess or low quality crops destined for donations.

**Programming**

The City could play a role in promoting the idea of donating excess or low quality food to the Food Bank or other food outreach organizations.

**Case Studies & Precedents**

None included

## 9.0 Summary and Recommendations

The previous sections detailed a number of options that together could form the basis of a sustainable community food system at SEFC. Each of the options was evaluated according to social, environmental, economic and other criteria. Two matrices summarizing the evaluation, Table 14-1 and Table 14-2 can be found in Appendix D.

In addition, we considered the suitability of the options specifically for the urban context of SEFC. Some of the options are more suitable for SEFC while others present far more challenges and may be more appropriately located elsewhere. Table 14-3 in Appendix D summarizes the suitability of the options for different types of spaces or buildings.

As a result of these two pieces of evaluation work and the feedback received from stakeholder workshops we recommend the following options. The options are not mutually exclusive and we recommend that several of the options be adopted as part of the overall SEFC Urban Agriculture Strategy:

### 9.1 Recommended Options

#### Food Production

We recommend that the city encourage food production to take place using the options below in spaces identified on the draft structure plan:

**Option G1 - Community Gardens:** Encourage Community Gardens in part of the Public Park, in the landscape around public buildings, and in some rights-of-way. There are also large open spaces identified adjacent to the park, between residential buildings that the City should consider retaining ownership of for use as community gardens.

**Option G2 - Private (backyard) and semi-private gardens at grade:** Encourage private (backyard) and semi-private at-grade gardens in the landscapes around all residential buildings.

**Option G3 - Rooftop Gardens:** Encourage rooftop gardens on the podiums (but not the towers) of concrete residential buildings.

**Option G4 - Balconies and Window Boxes:** Encourage balconies on residential buildings to be designed for food production.

**Option G5 - Edible Landscaping of the Public Realm:** Substitute purely ornamental landscapes in public areas with edible landscaping in public parks, and selected street right-of-ways where appropriate.

**Option G6 – Commercial Greenhouse:** Invest in (or allow) a small-scale commercial greenhouse at SEFC as a demonstration project on land retained by the City to illustrate how a commercial greenhouse operation might function effectively in a high-density urban area. Alternatively the Parks board may include a small-scale greenhouse in the Park as part of an overall educational strategy, possibly linked with a restaurant or other food facility.

**Option G7 – Commercial Market Gardens:** Not recommended at SEFC (except perhaps on a temporary basis) even though it may be appropriate in other areas of the City.

**Option G8 – Inside Buildings:** Allow certain urban agriculture uses inside commercial buildings and possibly residential buildings if the appropriate management approach can be found.

**Option G9 – School Gardens:** Encourage gardens at the elementary school and daycares.

**Option G10 – Aquaculture/Biaponics:** Of all the types of livestock that might be pursued at SEFC, we recommend intensive fish culture because of the numerous benefits in terms of high quality protein production, recycling of wastes, high yields, and educational opportunities. There are far fewer negative impacts from aquaculture than other forms of livestock. This option should be implemented as a small – scale demonstration project that could prove the viability of the approach which could then be adopted in other city locations.

**Option G11 – Micro Livestock:** The keeping of bees should be encouraged to produce honey and assist with pollination. Worms are valuable processor of waste but require no action on the part of the City.

### **Food Processing:**

We recommend the City encourage the following options:

**Option P1 – Shared Commercial Kitchen:** The City should encourage and support a shared commercial kitchen to encourage micro-food processors. In addition, small commercial food processors should be allowed to locate in appropriate commercial space at SEFC.

**Option P2 – Food Incubator:** The City should encourage and support a food training facility (incubator).

**Option P3 – Eco-Industrial Food Complex:** Because very little of SEFC is zoned industrial, it is probably not feasible to attempt a full-scale eco-industrial complex (this might be more appropriate at False Creek Flats). However, we recommend that one or more demonstration projects be implemented to demonstrate the concept. These demonstration projects will provide excellent opportunities to be a “living classroom” in which visitors and students can learn about the environment, agriculture and sustainable technologies.

### **Food Distribution**

We recommend the City encourage the following options:

**Option D1- Farmers Market:** The City should encourage and support the development of an permanent indoor and temporary outdoor farmers market as close as possible to the SkyTrain station.

**Option D2 - Direct Home Delivery:** The City should encourage this option although there is a minimal role for the City to play.

**Option D3 – Food Buying Clubs:** The City should encourage this option although there is a minimal role for the City to play.

**Option D4 - Grocery Store:** The City should encourage an affordable, locally-owned grocery store within the community near to the SkyTrain station.

**Option D5 - Emergency Food Services:** The City should encourage on-site growers and processors to donate excess food to a food bank and possibly encourage the location of an emergency meal program on the site

## 9.2 Implementation

So far in this report we have developed objectives and a number of options for a sustainable urban food system at SEFC. Each option included a number of implementation recommendations. Implementing the options will require leadership from the City, co-ordination of different stakeholders, sustained focus on the goals and objectives, and attention to detail in the planning, design and programming of the new community.

Table 9-1 provides a summary of the options, and the action required by stakeholders to implement the option in the various spaces available at SEFC. This table also summarizes the costs involved where these are known.

Further to the specific strategies included with each option, there are a number of more general implementation strategies that should be considered. These cut across several objectives and provide a co-ordinating or linking role:

- Provide a clear policy statement regarding which urban agriculture options the City will encourage at SEFC so that all stakeholders are clear about the city's level of commitment to sustainable food activity.
- Review regulations and bylaws that currently restrict urban agriculture and negotiate changes or flexibility in interpretation;
- Create new regulations, bylaws and design guidelines that require or encourage those urban agriculture practices (or opportunities) deemed appropriate for SEFC.
- Incorporate urban agriculture into the site planning and design process for new residential and commercial buildings/projects at SEFC.
- Use public buildings and land for demonstration projects that might include a small scale commercial greenhouse at grade, an eco-industrial food complex, an aquaculture/biaponics project, a commercial rooftop garden.
- Draft a package of incentives, including density bonusing/additional FSR, DCL/CAC reductions, and taxation credits to encourage private developers to include urban agriculture opportunities in their designs.
- Partner with NGOs to develop training modules for staff, designers and urban gardeners.
- Start with the easy options, and build success and support before moving on to more difficult options.
- Develop a neighbourhood culture that celebrates local food, agriculture, organic production and biodiversity.
- Designate a member of City staff as the urban agriculture co-ordinator to ensure that urban agriculture issues and opportunities are appropriately addressed at the appropriate stage.

Table 9-1: Summary of Implementation Tools for Various Options/Types of Spaces

Suitable Buildings /Spaces		Stakeholders Required to Act	Actions Required	Approximate Cost
<b>OPTIONS</b>				
<b>G1 Public Community Gardens</b>	Public Park	Parks Board  Community garden association	<ul style="list-style-type: none"> <li>Identify and allocate suitable space within public park with irrigation, composting facilities, public toilets nearby.</li> <li>Deliver municipal compost Develop an educational program/ demonstration garden</li> <li>Develop an agreement between Park's Board and Community Gardening Associations.</li> <li>Develop community gardens policy</li> <li>Manage gardens according to parks board policy</li> </ul>	\$49/ sq. metre
	School	School Board NGO such as Evergreen Foundation	<ul style="list-style-type: none"> <li>Identify suitable space for community gardens.</li> <li>Develop an agreement between School Board and Community Gardening Association.</li> </ul>	
	ROWs	City of Vancouver Planning/Engineering Departments.	<ul style="list-style-type: none"> <li>Identify suitable ROWs where community gardens will be allowed.</li> <li>Develop design guidelines for urban agriculture in ROWs</li> </ul>	
	Land Dedicated to Urban Agriculture	City of Vancouver	<ul style="list-style-type: none"> <li>Identify areas of land that might be dedicated to urban agriculture.</li> </ul>	
	Private yards	City Developers	<ul style="list-style-type: none"> <li>Ensure larger landscaped spaces are on East, West or South side of buildings where possible.</li> <li>Ensure installed topsoil is of a high quality and at least 18" thick and tilled.</li> </ul>	\$61 / sq. metre
<b>G2 Private (backyard) and Semi-private Gardens at Grade</b>		City  Developers  Strata Council	<ul style="list-style-type: none"> <li>Ensure larger landscaped spaces are on East, West or South side of buildings where possible.</li> <li>Ensure installed topsoil is of a high quality and at least 18" thick.</li> <li>As above</li> <li>Develop plan to manage semi-private open space.</li> </ul>	\$61 / sq. metre

Suitable Buildings /Spaces		Stakeholders Required to Act	Actions Required	Approximate Cost
<b>OPTIONS</b>				
<b>G3 Rooftop Gardens/ Greenhouses</b>	Concrete Residential Building (podiums and low rise only).	City Developers Food NGO Strata Council	<ul style="list-style-type: none"> <li>Require developers to provide rooftop gardens for residents on podiums in Landscape Design Guidelines, Do not include rooftop space or structures in height or FSR calculations</li> <li>Develop guidelines for designing rooftop spaces for food production</li> <li>Develop guidelines for managing food gardens in strata buildings.</li> </ul>	\$143.00/ square metre for rooftop gardens.  \$250 per square metre for greenhouse space  Plus structural upgrade (variable)
	Commercial/ Light Industrial Buildings	City Developers Commercial Greenhouse Operator	<ul style="list-style-type: none"> <li>Permit commercial greenhouse on rooftop of standalone commercial buildings</li> <li>Design Building for rooftop access to accommodate greenhouse</li> <li>Negotiate lease between commercial operator and developer</li> </ul>	\$250 per square metre for greenhouse
	Public Buildings	City	<ul style="list-style-type: none"> <li>Invest in rooftop greenhouse or rooftop garden as a demonstration project</li> <li>Partner with commercial operator or NGO and operate as educational project</li> </ul>	
	Residential Buildings Schools	City Food NGO	<ul style="list-style-type: none"> <li>Develop Design Guidelines for balconies.</li> <li>Develop Educational pamphlets for successful container growing</li> </ul>	\$388 per unit
<b>G4 Balconies</b>				
<b>G5 Edible Landscaping of the public/semi-public realm</b>	Parks ROWS Semi-Public Space of Residential Buildings	Parks Board City Engineering Dept. Developers	<ul style="list-style-type: none"> <li>Programming of public park</li> <li>Review Street Tree Design Guidelines</li> <li>Select edible varieties for landscaping public space</li> <li>Establish and train groups to manage street trees</li> </ul>	

Suitable Buildings /Spaces		Stakeholders Required to Act	Actions Required	Approximate Cost
<b>OPTIONS</b>				
<b>G6</b> Commercial Greenhouses at Grade	Land retained by the City for urban agriculture demonstration projects	City Commercial Grower/NGO	<ul style="list-style-type: none"> <li>Identify suitable land to retain for demo. project</li> <li>Zoning to allow retail use and restrict noxious practices</li> <li>City leases land to commercial grower</li> <li>Design Guidelines</li> </ul>	\$100 - \$200 per square metre for glass \$25 per square metre for polytunnel
<b>G7</b> Commercial Market Gardens at Grade	Not recommended			
<b>G8</b> Inside Buildings	Commercial Buildings Public Building as demonstration project Residential Buildings	Urban Grower City/NGO Developer/Strata	<ul style="list-style-type: none"> <li>Zoning</li> <li>Design Guidelines</li> <li>City Investment</li> <li>Design of interior space and management of operation.</li> </ul>	Highly variable
<b>G9</b> School Gardens	School Grounds	School Board NGO	<ul style="list-style-type: none"> <li>Programming</li> </ul>	\$49 / sq. metre for hard costs.
<b>G10</b> Aquaculture & Bioponics	Land retained by the City for urban agriculture demonstration projects	City Commercial Grower/NGO University	<ul style="list-style-type: none"> <li>Zoning to allow this use</li> <li>Invest in demonstration project</li> <li>Partner with NGO and/or university</li> </ul>	Highly variable
<b>G11</b> Micro-livestock	In community gardens	City NGO	<ul style="list-style-type: none"> <li>Allow use in zoning schedule</li> <li>Revise public health bylaw</li> </ul>	None
<b>P1</b> Commercial Food Processing Facility	Commercial Building	Developer City	<ul style="list-style-type: none"> <li>Allow use in SEFC Zoning Schedule</li> <li>Create design guidelines to ensure healthy operation</li> </ul>	



Suitable Buildings /Spaces		Stakeholders Required to Act	Actions Required	Approximate Cost
<b>OPTIONS</b>				
	Public Building	NGO	<ul style="list-style-type: none"> <li>Investment by City to create shared amenity.</li> </ul>	
<b>P2</b> Food incubator	Commercial Building Public Building	City Technical College	<ul style="list-style-type: none"> <li>Zoning to allow this use</li> <li>Create Design guidelines to ensure compatibility with neighbourhood</li> <li>City Investment to reflect public good.</li> </ul>	
<b>P3</b> Eco-industrial complex for food processing	Land retained by the City for urban agriculture demonstration projects	City University Developers	<ul style="list-style-type: none"> <li>Zoning to allow this use</li> <li>Design guidelines to ensure that operation is compatible and ecologically sound</li> <li>City Investment as a demo project for educational purposes.</li> </ul>	
<b>D1</b> Farmers Market	Public open space near to SkyTrain	City NGO Farmers Urban Growers	<ul style="list-style-type: none"> <li>Identify and design suitable outdoor or indoor space</li> <li>Advertise promote and build networks</li> <li>Regulate type of produce to be sold</li> </ul>	
<b>D2</b> Direct Home Delivery	Site wide	Home delivery company	<ul style="list-style-type: none"> <li>Promotion/marketing/information of the concept</li> </ul>	
<b>D3</b> Food Buying Clubs	Site wide	Residents/Strata	<ul style="list-style-type: none"> <li>Promotion/marketing/information</li> </ul>	
<b>D4</b> Grocery Store	Commercial Buildings	Grocery Store Owner City	<ul style="list-style-type: none"> <li>Zoning to allow use in suitable location</li> <li>Develop an agreement with owner to sell local produce</li> </ul>	
<b>D5</b> Emergency Food Services	Public Buildings	Food Bank Food Runners Growers/Gardeners/Processors	<ul style="list-style-type: none"> <li>Co-ordination between on site growers processors and food bank.</li> <li>Promoting idea to growers/processors.</li> </ul>	

### 9.3 A Continuum of Approaches to Urban Agriculture at SEFC

Some of the options described in this report are very simple to implement and require little investment, no change of policy/regulations and are already fairly common in Vancouver. Others are a lot more unusual and will require much greater thought, analysis, regulatory change and investment. We present Table 9-2 to illustrate that each option falls somewhere on a continuum of approaches from simple to difficult. Much of what is implemented at SEFC will depend on the level of comfort that various stakeholders have with each of the ideas and options presented, i.e. where they fall on the spectrum.

**Table 9-2: A Continuum of Approaches for Urban Agriculture (adapted from Barrs, 1997)**

Element	Stage 1 (simple)	Stage 2 (moderate)	Stage 3 (difficult)
Food Production	<ul style="list-style-type: none"> <li>Community gardens in park/ rights-of-way.</li> <li>Private (backyard) and semi-private gardens</li> <li>Balconies</li> </ul>	<ul style="list-style-type: none"> <li>Fruit trees and bushes in public/semi-private open space</li> <li>Rooftop gardens</li> <li>Bee keeping</li> </ul>	<ul style="list-style-type: none"> <li>Intensive aquaculture/biaponics</li> <li>Rooftop greenhouses</li> <li>Micro-livestock on open space</li> </ul>
Food Processing	<ul style="list-style-type: none"> <li>Home based</li> </ul>	<ul style="list-style-type: none"> <li>Commercial/Community Kitchens</li> <li>Food Training Facility (incubator)</li> </ul>	<ul style="list-style-type: none"> <li>Eco-industrial Food Complex</li> </ul>
Food Distribution	<ul style="list-style-type: none"> <li>Temporary Farmers market (for commercial growers)</li> <li>Direct Home delivery</li> <li>Food buying clubs</li> </ul>	<ul style="list-style-type: none"> <li>Framer's market (for non-commercial growers)</li> <li>Permanent Farmers Market</li> <li>Grocery Store</li> </ul>	<ul style="list-style-type: none"> <li>Micro food producers co-operative</li> </ul>
Waste management/ turning waste into food	<ul style="list-style-type: none"> <li>Home composting of kitchen and garden wastes</li> <li>Collection and use of rainwater in rain barrels.</li> </ul>	<ul style="list-style-type: none"> <li>Community-based composting of solid wastes</li> <li>Re-use of grey-water</li> <li>Rooftop greenhouses make use of rooftop heat</li> <li>Organic waste no longer collected by city</li> </ul>	<ul style="list-style-type: none"> <li>Eco-industrial Networking</li> <li>Local solar aquatic sewage treatment system integrated with food production</li> <li>Rooftop greenhouses reusing waste heat from heating ducts, industry and laundromats</li> </ul>
Economic regime	<ul style="list-style-type: none"> <li>Production for immediate family (and friends) needs only</li> </ul>	<ul style="list-style-type: none"> <li>Income patching - Production for immediate family, selling surplus to:               <ul style="list-style-type: none"> <li>Farmers markets</li> <li>Food box schemes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Commercial horticulture, aquaculture, processing businesses</li> </ul>

Element	Stage 1 (simple)	Stage 2 (moderate)	Stage 3 (difficult)
Improving technical capacity	<ul style="list-style-type: none"> <li>• Demonstration gardens</li> <li>• Information (skill sheets)</li> <li>• Design guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• City hired animateurs/ horticulturists</li> <li>• Training city staff</li> </ul>	<ul style="list-style-type: none"> <li>• Urban agriculture extension office</li> </ul>
Policy and regulatory Change	<ul style="list-style-type: none"> <li>• Review landscape standards</li> <li>• </li> </ul>	<ul style="list-style-type: none"> <li>• Allow grey-water use</li> <li>• Allow bee-keeping</li> <li>• Allow community gardeners to sell produce</li> <li>• Allow urban commercial greenhouses at SEFC</li> <li>• Prohibit use of pesticides</li> </ul>	<ul style="list-style-type: none"> <li>• Allow local sewage treatment systems that may provide purified waste water for irrigation</li> <li>• Allow small animal rearing</li> </ul>

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## **11.0 Appendix A – Policy, Regulations & Guidelines Having a Bearing on Urban Agriculture in Vancouver**

A series of standards, bylaws, policies and practices are in place at all levels of government which both implicitly and explicitly limit the extent to which urban agriculture could occur within South East False Creek. Although, at present, these approved and de facto practices would pose barriers to implementing urban agriculture strategies some are all subject to review by City staff and Council from time to time. This appendix lists the primary policy and bylaw barriers. It discusses their primary purpose and brings forward the specific issues affecting the potential for urban agriculture in South East False Creek.

### **Health Regulations**

#### **A. Overview of federal, provincial and municipal responsibility for food safety**

Provincial responsibilities in food control are shared between provincial agriculture and health ministries. For most food inspection programs, provinces are involved only with clients producing and marketing a product within that province. The federal government is involved with products that are shipped inter-provincially or internationally. Federal/Provincial committees in Agriculture and Health coordinate existing programs and are working toward a fully-coordinated Canadian food inspection system.

Provincial legislation provides inspection standards for agri-food products, including dairy, meat (including meat hygiene), fresh fruit and vegetables, and honey and maple products (in selected provinces). These responsibilities include provision of regulatory and advisory services regarding farm facility standards, recommended production practices and dairy inspection. Provincial governments also provide educational support and distribute information packages on safe food handling practices.

Municipal governments are responsible for enforcing provincially-mandated legislation on food control. Food inspections are carried out by public health inspectors hired either by the local health unit or provincial government. Specific responsibilities at the municipal level include:

- routine inspections of all establishments which sell and serve food,
- respond on demand basis to all complaints of food-borne infections,
- education of consumers and training of food handlers on safe food handling practices,
- testing and monitoring of local water supply.

#### **B. Provincial Government Food Safety Regulations**

To avoid potential problems, food processors should have:

- a well-designed food processing facility;
- procedures for the prevention of microbiological, chemical, or physical
- defects or hazards within the products;
- proper food handler hygiene and food handling practices;



- controlled processing procedures;
- a superior sanitation program; and
- a pest-control management system.

The following are a few key principles that apply to nearly all food processing facilities (except for the very small):

1. A food processing facility should be designed so that the various parts of it are separate from one another. In particular:

- Raw materials should be received in a separate area from the processing facility, as they are considered potential sources of contamination be it microbiological, physical, or from pests.
- One set of rules or procedures should be developed for this area and applied to counteract contaminants.
- The processing area should be a separate area. Also, the processing of raw and cooked materials should be in separate locations in the processing area. In most instances, this area will have the highest level of **sanitation** procedures practiced. This is where the product is going to experience the most contact with the environment (i.e. machinery, processing aids, workers, and the atmosphere).
- The warehousing and shipping area should be another separate area. This is a potential source of infestation and rodent entry into the facility.
- It is easier to maintain a sanitary environment in a plant with more segregated areas. Each area will have different focus and a different set of procedures to ensure the overall sanitation of the plant.

2. The area surrounding a food processing plant must also be given very serious consideration.

- If the facility itself is located within a larger facility, it is important that all the activities be compatible. For example, a food processor would not want to locate in the same facility as a dry cleaner with its characteristic odors and questionable chemicals. A food processor would avoid a location with a welding firm next door that generates iron filings and does not have the same concern for sanitation.
- If the facility is a stand-alone building, it is important to maintain a boundary around the facility. The best idea is to have a paved apron, or equivalent, around the perimeter. The apron should be higher than the surrounding area and sloped away from the building. This is a deterrent to all kinds of pests and rodents and also minimizes the tracking of dirt and mud into the plant.
- If sharing warehouse facilities, make certain that only compatible products are stored together. Do not store chemicals in the racks above the food products, or even in the same area. Use common sense when storing
- products.

3. Within the facility, starting right from construction, preventative measures should be taken. For example, use square iron beams that are totally sealed off instead of “I” beams that have ledges where dust, debris, and birds can land and accumulate. When using angle irons for construction, install them □□□□ rather than “L”. This will prevent ledges that are difficult to clear.

The construction material and finishing should be done so that:

- □there are no harbours for pests;
- cleaning is easier; and
- cracks and crevices are least likely to develop and if they do, they are easily repaired.

For example, concrete floors with epoxy coverings as opposed to wooden or asphalt bases are preferred, and where washing will be a common practice, the floors should flow to drains that drain well. If there is potential for materials to enter the drain, sewage disposal regulations and controls should be checked and taken into account in the design.

4. The frequency of cleaning processing equipment will depend very specifically on the amount of use and the nature of the product being processed. However, as a rule, equipment must be made as easily accessible for cleaning as possible and cleaned after use.

5. Packaging, and particularly the handling of packaging, is an extremely important facet of good sanitation practices. Common sense should prevail. The packaging itself should be well packaged and protected to prevent foreign materials from entering it or adhering to it in transit and prior to arriving at the packaging work station. Some examples of common sense and good practices are:

- Receive open bottles, jars, cans, etc. up-side down so that foreign material cannot fall into them prior to use;
- □Keep to a minimum the number of packages that are upright and open to the environment at any given time, particularly when vacating the line during breaks or absences; and
- □Seal the container as soon after filling as possible to minimize the time it is left open to the environment.
- In the final phase of storage and shipping of a food product, the single most important practice would be to diligently rotate the inventory practicing a FIFO approach (first in, first out).

Other important factors to consider are:

- □clean, dry pallets; and
- □clean, dry, sound transport vehicles.

7. Personnel and training of personnel are the most important factors in maintaining a

sanitary facility and product. No one person can have sole responsibility. All people involved in the operation must participate. All people associated with the plant must be made aware of the importance of their actions within the plant. This involves training, on-going communication, and most importantly, common sense.

8. HACCP (Hazard Analysis Critical Control Points), Sanitation, Recall, and Allergen programs are examples of four food management programs used for the assurance of safety and/or quality. You may wish to develop your food safety and sanitation management program in conjunction with a quality program. See HACCP and ISO 9000 in Section 9 for further information.

The food safety HACCP program consists of establishing Critical Control Points. These are locations in the plant or steps in the process where lack of control would result in a food safety hazard. The Critical Limit is a standard that must be met to ensure that a food safety hazard does not occur at a Critical Control Point.

Every food processor should establish programs such as HACCP with written procedures that include:

- Identification of all Critical Control Points;
- Critical Limits for all Critical Control Points;
- Procedure to be followed to ensure adherence to the critical limits; and
- The action to be taken in the event that the critical limits are not adhered to.

## **C: Federal Government Jurisdiction related to food safety**

### **Health Canada**

Legislative mandate (food safety and nutrition): **Food and Drugs Act** and associated regulations.

The minister of health has broad responsibilities for the protection of health of Canadians and specific responsibilities to act as the principal health advisor to other federal departments and agencies on all occupational and public health matters. Audits food inspection systems of delivery agencies.

Health Canada (HC) establishes food safety standards and applies them by inspecting non-registered establishments as the health authority for the federal government.

HC authority extends to all foods sold in Canada including imported, domestic.

The **food and drugs act** has authority under the criminal law.

### **Agriculture and Agri-Food Canada**

Legislative mandate for food inspection: meat inspection act and associated regulations, Canada agricultural products act and regulations, food and drugs act (fraud and labelling).

The minister of agriculture has broad responsibilities to ensure the safety, quality and marketability of agricultural and food products, imported, exported or domestic. to encourage market responsiveness, to promote industry self reliance and stability, to build regional strengths and diversity and to protect agricultural resources and the environment.

This department enforces for agri-food products\*\* the relevant health and safety provisions of Canada's **food and drugs act** and regulations and the packaging and labelling requirements of the consumer packaging and labelling act.

The department is also responsible for the development and amendment of the economic fraud provisions of the **food and drugs act** and regulations relating to food labelling and packaging and administration at all levels of trade except retail\*.

Responsible for registration, licensing and inspection of federally registered/licensed establishments (about 3400).

Authority extends to agri-food products\*\* imported, exported, moving inter-provincially or produced in federally registered establishments.

\* Industry Canada has taken over responsibility for federal retail food inspection and labelling.

\*\* Agri-food products include meat and meat products, dairy products (not including fluid milk), shell and processed eggs, fresh and processed fruits and vegetables, honey and maple products.

## D. Municipal Health Regulations

Health regulations for Vancouver are administered by the Vancouver Coastal Health Authority

The Environmental Health Division is part of the Vancouver Coastal Health Authority, under the Medical Health Officer, Dr. John Blatherwick. In addition to providing provincially mandated health protection services, the Environmental Health Division also provides services to the public of Vancouver through an arrangement with the City of Vancouver

The Environmental Health programs in Vancouver comprise a broad array of strategies and interventions which have as their objective the protection of public health by minimizing the environmental health risks to the population.

These programs are mainly legislative based and include food safety, tobacco control and tobacco demand reduction, drinking water quality, recreational water quality, air quality (indoor and outdoor), Community Care Facilities Licensing, pest control and pesticide reduction, noise control, housing and sanitation, on-site sewage disposal, environmental protection and promotion, enteric disease surveillance, environmental health promotion activities, health risk assessment and components of injury prevention. They focus on reducing risks at the interface between the environment and the population.

### City of Vancouver - Health Bylaw

This bylaw is concerned with maintaining high standards of public health in indoor premises. The bylaw gives the Medical Health Officer powers to ensure facilities are kept in a sanitary condition.

Section 2.6 The Medical Health Officer may detain, examine and prohibit the handling or disposition of any goods, foods and conveyances of any kind considered by the Medical Health Officer to be a menace to health by reason of contact with communicable diseases.

The Bylaw gives the MOH the power to regulate Food Establishments to ensure high levels of sanitation for the purpose of protecting public health. Especially relevant for this study is Section 3.7 which states:

- The operator of every food establishment or supplementary food program shall:
  - Deal only with wholesome food which has been obtained from an approved source, and in its preparation, handling and storage has been kept in a clean, unadulterated and fresh condition, and when packaged, has been clearly labelled.
  - Maintain the food establishment and all fixtures used in its operation in clean condition and in serviceable repair.

Section 3.42 The slaughter of animals shall be done only in buildings and in a manner approved by the Medical Health Officer.

Section 3.44 No operator...shall store, handle, serve, process, display, distribute, transport, offer for sale or sell poultry eggs which are upgraded...

Section 3.50 No perishable food shall be delivered in any vehicle that is not fully enclosed and mechanically refrigerated.

The bylaw prohibits the keeping of livestock in the City of Vancouver except in those zones where livestock are explicitly allowed such as the R#-# zone of Southlands where horses are specifically allowed.

Section 4.1 No person shall keep or permit to be harboured any horses, donkeys, cattle, swine, sheep, or goats or any live poultry or fowl, including ducks, geese, turkeys, chickens, pheasants or quail. Or operate an apiary or otherwise keep bees for any purpose in the City except...where otherwise permitted by, the Zoning and Development By-law, unless otherwise stated in this bylaw.

The bylaw strictly controls the use of pesticides inside and outside a building by requiring extensive notice to occupants.

The bylaw allows for fines of between \$100 and \$2000 per offence.

## **Food Donor Encouragement Act**

In April of 1997, the Provincial Government passed the Food Donor Encouragement Act. The act is intended to protect donors from liability as they act in good faith to donate surplus perishable food, while ensuring recipients' rights are protected. The act encourages organizations to make donations of perishable food and provides a valuable source of nutrition to our recipients.

Source: The information in this appendix was downloaded from the Government of Canada, Government of British Columbia, and City of Vancouver websites and a review of the City of Vancouver Public Health Bylaw.

## **City of Vancouver – Street Tree and Landscape Guidelines**

### **How landscape standards are used**

There are two types of landscaping standard – Citywide standards and zone-specific standards. Citywide standards apply unless superseded by zone-specific standards that apply to a specific zone or area of the City.

Landscaping standards are developed specifically for each zone within the city including comprehensive development zones (CD-1) where the zoning, design and landscaping standards are tailored uniquely to the specific project. Development plans (including site plans, building plans and landscape plans) are reviewed by City Landscape Review Staff at the re-zoning stage, development permit stage, and building permit stage to ensure that the intent of the standards has been met by the designer.

The building and landscape is inspected after construction and installation are complete to ensure that the plans have been followed accurately, and again after one year to ensure that the building and landscape are still functioning as intended.

### **A. Street Tree and Landscape Guidelines for the Public Realm, 2001 Edition**

This is an omnibus document that includes:

- Street Tree Bylaw, 1992
- Various Landscape Application Approval Requirements
- Tree species, size, location and spacing standards
- Tree planting standards
- Shrub planting standards
- Hard landscaping around tree standards
- Boulevard and Median Planting standards
- Landscape Guidelines for City Boulevards
- Tree removal and replacement policies and procedures
- Forms and procedures for work in and around street trees

Urban Agriculture was not envisioned when these documents were created and therefore, most sections, in whole or in part, do not apply directly to the capacity for urban agriculture in SEFC. The following is an analysis of only those policies, practices and procedures that would likely create a barrier to implementing urban agriculture in SEFC.

### **B. Street Tree Bylaw, No. 5985, 1992 (A bylaw to regulate trees on boulevards within City streets)**

This bylaw delegates authority for the selection, planting and care of trees to the Board of Parks and Recreation. It also forbids the planting of any tree not in compliance with standards set by the City

Engineer and the General Manager of the Vancouver Board of Parks and Recreation. It also enables the Board of Parks and Recreation to remove any tree for virtually any reason the General Manager deems applicable, including for reasons of hazard, nuisance, disease. The bylaw also vests in the VPB the sole responsibility for maintenance of trees on City streets, unless otherwise formally authorized and executed by a qualified tree company.

### **Issues affecting Urban Agriculture**

This bylaw and the powers it places solely in the Vancouver Board of Parks and Recreation would significantly limit the extent to which food-bearing plants could be incorporated on City streets and within City rights of way. As it is now written, the Street Tree Bylaw does not anticipate, nor encourage, the planting of street edges for urban agriculture purposes, nor does it anticipate the planting and maintenance of any type of tree by other than City or formally authorized experts. As urban agriculture within SEFC evolves, it is possible that a range of participants will be involved in the planting, care and maintenance of trees within what is now formally considered an area where laymen and novice gardeners are expressly forbidden.

The Park Board does not have the resources or the expertise to manage fruit or nut producing trees, at this time. Consequently, if City street verges, boulevards and other rights of way are to be used for this type of urban agriculture new systems for managing these lands would be required. These new systems would have to be acceptable within a revised Street Tree Bylaw.

The standards (discussed below) referenced in the bylaw would also have to be modified, but as an overarching, city-wide “enabling” document, the Street Tree Bylaw should be amended to permit, if not encourage, urban agriculture in the City of Vancouver.

### **C. Landscape Application Approval Requirements**

A number of process and application requirements are specified within the 2001 Edition of the “Street Tree and Landscape Guidelines for the Public Realm.” Most of these requirements are intended to facilitate the efficient and timely movement of a landscape application through the applicable approving departments.

#### **Issues affecting Urban Agriculture**

Several barriers to urban agriculture exist within the process and approval requirements for landscape changes to City streets. These include:

- Lack of ability to approve seasonal and/or ongoing changes to a landscape that would be required for successful urban agriculture. For example, fruit or nut thinning and picking, or replanting a rotating crop like raspberries.
- The minimum 7 metre tree spacing (as per Permission for Planting Trees on City Property) would not be conducive to most urban agriculture.
- Tree surrounds or grates (new plantings) and stone epoxy (established plantings) are required. This requirement would not likely be sympathetic with a range of urban agriculture plantings.



## **D. Tree species, size, location and spacing standards**

Standards applicable to types of trees, size, location and spacing generally apply to conventional street trees within the bylaw and the supporting documents. They are required in order to ensure the urban forest is planted, maintained and cared for in a consistent manner and within an affordable routine.

### **Issues affecting Urban Agriculture**

These standards would severely limit the type, extent and viability of urban agriculture on the City street rights of way. As has been mentioned previously, the primary purpose of these standards does not include urban agriculture and hence they would have to be refined, or a stand alone standard, specifically written for SEFC created.

The standards create barriers including:

The range of species allowed are:

- primarily non fruiting or nut bearing species
- the “cleanest” of trees
- Not chosen for pollination purposes

The size of species are:

- Applicable to some urban agriculture
- Nursery stock sizes are for large caliper street trees, not fruit bearing trees or shrubs

The location of species are:

- Primarily aimed at large shade trees
- Do not take into account modern dense planting urban agriculture strategies require
- Do not consider cane crops as landscape plantings

## **E. Tree and Shrub Planting Standards**

The tree and shrub standards are in place to ensure that trees and landscape plantings are planted as per acknowledged industry standards. These are intended to give developers, home owners and contractors a readily understandable, proven set of construction specifications that City staff (in consultation with consultants, the BC Landscape and Nursery Association and others) have found to be effective in this climate and across a variety of soil types within the Vancouver area.

### **Issues affecting Urban Agriculture**

The primary barrier posed by these standards is the assumption that most, if not all, the planting soil would be a) installed once and not amended and b) covered with a grate, concrete cover or gravel epoxy. This poses a hindrance to urban agriculture by:

- Limiting access to the growing medium for amendment and tilling
- Restricted open soil so that only certain types of trees would survive
- Not allowing for the planting of row, cane or tree crops.

## **F. Landscape Guidelines for City Boulevards**

In general, these guidelines are intended to assist property owners whose intention is to grow landscaping (read shrubs, herbaceous, annual plants, not trees) in the boulevard areas adjacent to their property. It is expected that much of the small scale public landscapes that could potentially be utilized for urban agriculture would fall under this, or a similar, type of guideline.

### **Issues affecting Urban Agriculture**

As written, this guideline limits the potential and viability of urban agriculture primarily due to the lack of an urban agriculture intention or objective. Although the guideline may be appropriate as a City-wide policy, it would not, generally, be conducive to a neighbourhood where urban agriculture is a primary planning principle. Having said that, one of the general principles of these particular guidelines is to “enhance the pedestrian street environment.” If truly effective, an urban agriculture strategy would accomplish just that principle.

The performance standards in the Landscape Guidelines for City Boulevards pose a barrier to urban agriculture in SEFC by:

- Insisting that landscaping not interfere with pedestrian use of the sidewalk
- Limiting maximum heights of plants to 1 metre
- Ensuring ample provision to cross the boulevard is maintained
- Only trees and grass are permitted in the outside boulevard (closest to the curb)

## **Conclusion**

Although the majority of the applicable documents relating to trees and landscape plantings in the public realm do not encourage urban agriculture, they could, given appropriate guidelines be permitted. This may occur through amendments, or the creation of guidelines specific to SEFC. Presumably, although not stated, the overarching goal of enhancing the urban forest and urban landscape is to improve the environmental and aesthetic integrity of the City. An effective urban agriculture strategy should support that goal and hence, related policies adopted, changed and created that articulate it for current and future property owners.

## Vancouver Parks Board Community Gardens Policy

On April 15th, 1996 The Vancouver Board of Park's & Recreation unanimously approved a community gardens policy. The policy commits the Board to helping groups find resource information on gardens, locate suitable sites in the city (which may be in public parks), develop user agreements with the owners of the selected site and develop a community environmental education program. It is important to note that Park land can only be used if it is determined that it is the most suitable land i.e. once other options for community gardens have been exhausted.

The policy is reproduced here in full:

### Definition

The Board recognizes community gardening as a valuable recreation activity that can contribute to community development, environmental awareness, positive social interaction and community education. The Board will collaborate with interested groups in assisting the development of community gardens.

For the purposes of this policy, a community garden is defined as a community environmental education program operated by a non-profit society. The program has the following features:

- A piece of land is utilized by the society to produce food and flowers for the personal use of society members.
- A community education program is in place which encourages the involvement of schools, youth groups and citizens who do not have an assigned plot in gardening activities.

### Clause One

The Board will support the development of community gardens in Vancouver through the following means:

- Providing access to information on the development and operation of community gardens.
- Assisting interested groups in searching for suitable land for the development of community gardens. This inventory must include City-owned land, land controlled by other government agencies, and privately owned land.
- Assisting in the development of user agreements with the owners of sites chosen.
- Assisting with the development of a community environmental education program.

### Clause Two

If it is determined that park land is the most suitable site for community gardens, the following conditions will apply:

- The garden is developed at no cost to the Board, except that prior to the first season, the Board will, at its cost, prepare the site for planting by removing grass, ploughing the soil and adding compost.

- A community consultation process indicates neighbourhood support for the garden.
- A garden site plan must be drawn up and approved by the General Manager. The plan must include the layout of the plots and indicate any proposed structures or fences.
- A non-profit society agrees to develop and operate the gardens according to a users agreement which will specify the term of use, management responsibilities, user fees and access procedures including the following specific terms:
  - a) The term of the user agreement will not exceed five years.
  - b) Allotments of space must be made from a waiting list on a first come first served basis.
  - c) Membership in the Society, and the opportunity to be allotted a plot, must be open to any resident of Vancouver.
  - d) No pesticides are to be used.
  - e) Allotment fees charged by the society must be approved by the General Manager.
  - f) The Society must adhere to maintenance standards set by the Board.
  - g) No barriers to general public access to the site can be erected.

Although located on Parks with the prior approval of the Park Board, Community Gardens are operated by volunteers from the community.

[Contact list not included]

## **12.0 Appendix B – Case Studies**

## Community Gardens

### Strathcona Community Gardens



**Figure 12-1 Greenhouse at Cottonwood Community Gardens (Photo – Rob Barrs)**

**Figure 12-2: Strathcona Community Gardens, Vancouver (Photo – Rob Barrs)**

Established in 1985 on 3 acres of land owned by Vancouver Parks Board, Strathcona Community Gardens is the oldest and one of the most successful of the city's community gardens. It makes a valuable contribution to the local community in terms of healthy, nutritious food for the gardeners and a sense of shared ownership for the whole neighbourhood. In addition to the 200 individual plots (average size 105 sq.ft.), the association has also developed two greenhouses, has planted a mature orchard with standard and espaliered fruit trees (some of them heritage varieties) and a number of bee hives that assist with plant pollination. A recently completed clubhouse features a composting toilet and solar powered electric system and was built partly from recycled materials.

### West Vancouver Community Gardens



**Figure 12-3: Community Gardens in West Vancouver (Photo: Rob Barrs)**

West Vancouver has a number of community garden projects such as this one that is on the edge of the sea wall and occupies a vacant lot. The City is trying to assemble land along the waterfront for a park and until the land is fully assembled, lots like this are ideal for small community pocket gardens. The gardens co-exist very well with the established houses in the neighbourhood.



## Rooftop Gardens

Figure 12-4: Foodshare Rooftop Garden and Greenhouse, Toronto. (Photos: Foodshare)





Figure 12-5: Executive Chef, Fairmont Waterfront Hotel, Vancouver. (Photo: Rob Barrs)





### **Fairmont Waterfront Hotel**

This is perhaps the best example of a rooftop garden in Vancouver. Executive Chef Daryle Nagata's has championed this rooftop garden which now provides herbs, vegetables and fruit to the restaurant from February to November. Managed by a consultant Master Gardener (Elaine Stevens) and assisted by other Master Gardeners and community volunteers rewarded in food, the 2100 sq.ft garden saves the Hotel approximately \$30 –40,000 per year in food costs and has been a very effective marketing vehicle. Many of these savings are spent on garden costs.

The Rooftop garden is on a third storey podium and is accessed using the guest elevators which can cause problems. Shade from new building adjacent has had a big impact on solar access – need light especially for flower production. However get building light bouncing between buildings that have reflective glass.

The garden has to look good 365 days of the year because hotel rooms look down on the garden, a difference from a community garden. Ivy was originally in soil, so the soil was depleted and had horsetails in it and it had to be carried out through the hotel elevators and replaced / amended. Each type of plant has different soil needs and this is planned. The garden is completely organic and they have special suppliers of organic soil amendments and fertilizers. The soil is over a foot and a half deep and could be as much as three feet deep.

There is no green house and they cannot compost due to risk of rats and odour. In future gravel paths should be replaced with wheelchair accessible paths. (personal communications with Elaine Stevens and Daryle Nagata, 2002).

### **Older Women's Network Housing Co-op, Toronto**

This housing co-operative has won awards for Toronto's best kept rooftop garden. Residents use containers to grow good quality garden produce. Protected from wind by enclosing wall creating suitable micro-climate conditions



**Figure 12-6: Older Women's Housing Co-op, Toronto. (Kuhn)**

### **Royal York Hotel**

Royal York Hotel - planters, filled with herbs for the hotel's restaurant (Fairholm, 1999). Planters are maintained by hotel staff.



**Figure 12-7: Royal York Hotel Rooftop Garden. (Photo: Alan Duncan)**

### **Foodshare Rooftop Garden and Greenhouse**

FoodShare's Urban Agriculture Program uses planters to grow tomatoes, green beans, peppers, eggplant, herbs and greens largely for the Good Food Box (another FoodShare program). 3 bee hives are also maintained (Baker 2001). Vera Top reports that the rooftop is not ideal (a retrofit) for the purpose and much more could be with a building that is designed for rooftop agriculture from scratch. (see Figure 12-4)

### **Mary Lambert Swale Housing Co-op**

Mary Lambert-Swale housing project (2250 sq feet of cedar planters, which provide each of the 75 tenants with a 5 x 5 foot roof garden plot, growing vegetables, herbs and even fruit trees (Peck et al 1999).

### **Toronto City Hall demonstration project**

Toronto City Hall demonstration project - 6 different plots have been established, some extensive others semi-intensive. Two semi-intensive plots will grow vegetables and herbs, such as peppers, tomatoes, corn, beans, squash, chives, and sage. Other semi-intensive plots are planted with black oak savanna species and native prairie species planted to attract birds and butterflies, while the extensive plots host alpine and dryland species (Green roofs for healthy cities 2001).





**Figure 12-8: Mary Lambert-Swale Housing Co-op. Photo: Monica Kuhn.**

### **Ecohouse (St. Petersburg)**

Ecohouse (St. Petersburg) uses 4 to 8 cm beds built on existing apartment building rooftop. Soil obtained from vermin-composting of the building resident's wastes is used for planting of vegetables (zucchini, lettuce, broccoli, tomatoes, cucumbers), herbs (parsley, dill), and soft fruit (strawberries, gooseberries, currants), and grass in thin beds of 4-8 cm on the roof-top. Produce from the rooftop garden is consumed by residents. Any excess is sold on the market or exchanged for services with maintenance companies (St Petersburg Sustainable Urban Community Development Project, 1999).



Figure 12-9: Simple grow bags on a St. Petersburg Rooftop. Photo: Rooftop Garden Resource Society

### Microfarm Group, Brisbane, Australia

Wilson reports that the Brisbane, Australia based Microfarm Group completed a feasibility study in May, 1999, of the potential of urban rooftop microfarming in Mt Gravatt Central, a suburban shopping centre on the southside of the city of Brisbane. The feasibility study revealed that an investment of about \$212,000 on around 1,000 square metres of space, could provide about 20% pa return after paying the wages of three to four employees (including a manager), using the food wastes of local restaurants as the basis of an inorganic hydroponic nutrient for growing salad vegetables, and providing food for native fish -- both of which could be sold back to the same restaurants. The 600 sq. ft rooftop micro-farm in will be profitable within 18 months and create several direct and indirect jobs. The project is a *nutrient capture system*. It offers organic waste recycling, reduction of greenhouse gases, as well as traffic reduction and building cooling as side-benefits.

A step by step process will flow more or less as follows:

- Restaurant>waste>grind>worms>castings>fruits>fish tanks>fish>
  - nutrient liquor>hydroponics>crops>Restaurant



Initial investment [inputs are available in the market] A\$ 212,500.<sup>23</sup>

## **Eli Zabar**

In New York City Eli Zabar perhaps best exemplifies rooftop niche food production in the inner-city. He has a gourmet deli on east 64<sup>th</sup> street, a gourmet restaurant on east 80<sup>th</sup> street and a roof-top market garden on east 94<sup>th</sup> street all in the upper-income high density borough of Manhattan. He was recently noted in a restaurant guide for selling one sliced tomato and olive oil for US\$ 9.00.

Eli has found that production on the 14<sup>th</sup> floor, within a mile of the kitchen, makes economic sense, given that you start with the menu in hand when doing the planting.<sup>24</sup>

## **Inside Buildings**

### **Chicago Indoor Gardens**

Chicago indoor gardens is a privately-owned, for-profit business that employs ten people to grow eleven varieties of sprouted grasses and beans under artificial light in a small factory building on the Chicago's Northwest side. The products are marketed to Dominick's (a supermarket chain in Chicago), Whole Foods Markets, and health food stores. The company was established in 1987, and earned revenues of \$700,000 in 1998. (Kaufman and Bailkey, 2000)

### **Philly Farms Mushrooms**

Kaufman and Bailkey (2000) report that Philly Farms Mushrooms are currently planning a state-of-the-art commercial mushroom farm to be sited in a 38,500 sq. ft. renovated building along the Delaware River. Philly Farms Mushrooms represents a partnership between Urban Strategies, Inc. of Philadelphia, a private firm that would coordinate the project, and Kaolin Mushroom Farms located in Chester County, Pennsylvania, one of the largest mushroom producers in the United States. The idea of expanding Pennsylvania's well-established mushroom industry into the inner city has been discussed for several years, and Philly Farms, and the new technology it will employ, is seen as a foundation for larger-scale food production in Philadelphia.

Philly Farms will employ the "tray" growing method, where 4-foot by 8-foot trays containing the mushroom-growing substrate (produced at Kaolin Farms and brought into the city) are moved into separate rooms, each room having different environmental conditions. This contrasts with the more common "shelf" method, where the substrate remains in one location throughout the growing period, with the room environment changing as the mushroom crop matures.

The facility will produce six million pounds of the white button mushroom annually, and probably half-million pounds of Crimini and Portabella brown mushroom varieties. Projected gross revenues is six million dollars

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<sup>23</sup> Southside Chamber of Commerce, *Urban Microfarm Feasibility Study 1998*, [www.L-coco.info](http://www.L-coco.info)

<sup>24</sup> Eli Zabar, Gourmet Garage 301 East 64<sup>th</sup> St NYC Phone (212) 535-5880

annually, and upwards of seventy full-time jobs will be created, with temporary employment added during peak production. The mushrooms would be marketed to local restaurants, retailers, wholesalers and food service suppliers. The partnership behind Philly Farms expects the venture to be fully operational by 2002. (Kaufman and Bailkey, 2000)

### **Richmond Specialty Mushroom Farms Ltd.**

Richmond Specialty Mushroom Farms is a small family run operation that has developed a reliable. Computer-controlled organic method of cultivating specialty mushrooms such as Portabellas, oyster and crimini mushrooms. They offer turnkey operations to housed in shipping containers. Personal communication with the owner/operator established that an operator could generate at least 100 lbs of specialty mushrooms per week./per container. = \$500/week retail. The Farm's current output exceeds \$300,000.



**Figure 12-10: Mushrooms grown using sophisticated technology. Photo: Richmond Specialty Mushroom Farms.**

## **Edible Landscaping of the Public Realm**

### **The Fruit Tree Project**

The Fruit Tree Project is a community based food project that collects the unwanted fruit from backyard fruit trees, cares for neglected fruit trees and distributes food to individuals in need and food banks. The fruit is used as a valuable source of food with some of it being preserved at neighbourhood canning workshops (in community kitchens). The idea is to connect those who have excess fruit with those that have time and energy to harvest it. The project is also about bringing neighbours together and building community. There are now seven groups in the region. The most successful, in Victoria, harvested 18,000 lb.s of fruit last season. Vancouver harvested 3500 lb.s last year. (personal communication with project volunteer and project brochure, 2002).

### **New York Tree Care by Citizens**

In response to the ongoing need to not only plant more trees in North American cities, but also to find the resources to maintain them, several American cities have enlisted the assistance of volunteers to plant, water, prune and maintain street trees.

In New York City, for example, concerned citizens in the mid – 1970's started the New York City Street Tree Consortium (STC) for training citizens in tree maintenance. The STC has trained thousands of volunteers in pruning and general care for trees. The volunteers in turn work with community groups, teaching their members how to care for both the trees STC has planted and the ones already in the neighbourhood.

STC has also set up an advisory service, dispensing information and advice to interested groups on a sliding scale basis. They have also established advanced seminars in tree care and published a book, *Street Trees*, by Barbara Schaedler, meant for use in the field and described as a definitive text on northern street trees.

Other cities in the US have similar programs. In Los Angeles, TreePeople began its citizen forester training program in 1986 and has since trained scores of volunteers who then organize plantings and tree care events. The volunteers receive reference manuals as well as the official training. These citizen foresters work with community groups, scout groups and police departments.

In Providence, R.I., citizens have combined tree care with an effort to give high-school dropouts a high school degree and good job. Called the Southside Community Land Trust, the program selects four teens that are enrolled in a General Education Degree program and trains them at a city nursery. When they have earned their GED they are given full time jobs in the nursery/tree care industry. (Headley, 1992)

## Commercial Market Gardens

### Big Bend Burnaby



**Figure 12-11: Market Gardens in Big Bend, Burnaby. (Photo: Rob Barrs)**

### Kon Kai Farms, Berkeley, California

Urban farms in other areas of the N. America report extremely high value production on very small acreages. Michael Abelman mentions Kon Kai Farms in Berkeley Cal. which grosses an average of \$250,000 (and as much as \$300,000) per year on 2/5 of an acre specializing in gourmet salad greens grown on raised beds. (Ableman, 1998)



## Sausalito

Farming a city lot near downtown Sausalito, Cal. an urban farmer is netting between \$30,000 and \$45,000 annually growing watercress (Personal Communication, Masselink, 2002)

## FoodShare

Foodshare of Toronto has been promoting small-scale entrepreneurial inner-city farming in Toronto for the past five years. Its crops include: sprouts, seedlings, herbs, salad crops, flowers, vegetables of all sorts, berries, bees, compost, and specialty ethnic crops. Its micro-enterprise program is based in four principles:

- a) growth is slow and steady, [*income increases season by season*]
- b) use of accessible technologies,
- c) capacity building in all aspects of the enterprise,
- d) encourage closed-loop cycles, *waste is food*, weeds to compost to food.

Production is on rooftop, in greenhouse, on idle land, and on institutional land. All sales are local.<sup>25</sup>

## The Silwood Family

The Silwood Family runs a hydroponic farm on an ordinary lot in an inner suburb of Auckland, New Zealand. With an average year-round labour force of seven, it produces 18 crops of gourmet lettuce on a quarter-acre (about 700 square meters); the same amount of lettuce would require the equivalent of 6,000 square meters of growing area in an ordinary greenhouse.

The current revenue is more than NZ\$400,000 a year, with potential for even higher turnover as the technology and management is further refined. In 1996-97, turnover for every square meter of growing area was NZ\$592. A duplicate start up may cost only about NZ\$200,000.

Fresh lettuce output is boosted significantly by using sterilized water, three tiers of hydroponic growing channels, 'daylight' lights for extended growing time, added carbon dioxide and judicious heating.

The product line is fresh, gourmet lettuce and herbs grown from both imported and local seed, and from on-site varietal development. A choice of up to 20 different varieties gives customers daily options in taste and color.

Six local supermarket buyers and 30 local restaurant owners, representing 100 percent of sales, have sought sustained, year-round supply from the Silwood urban farm. All the farm's customers are within 10 minutes delivery time. On call service is available.

## Toh Orchids

Toh Orchids, established in 1973 on three Singapore hectares, exports over 30 varieties of cut-orchids worldwide. Toh does its own selection of new hybrids and applies micro-propagation in its own tissue culture laboratory. Delivery is within 24 hours to all major metropolitan markets worldwide.<sup>26</sup>

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<sup>26</sup> Address on file. See "aquaculture" below

## Greensgrow Philadelphia Project

Greensgrow Philadelphia Project<sub>27</sub> is an experiment in urban farming begun in 1998 on the site of an abandoned galvanized steel plant. Its mission is the transformation of inner city *brownfields* into green businesses. Greensgrow, five minutes from the city centre, produces gourmet vegetables, herbs, annuals, perennials, seedlings, and flowers. In addition to its own production it belongs to a co-op of suburban farmers who provide meat, poultry, dairy and seasonal produce. Greensgrow has waiting lists of restaurants and membership in its CSA. It can not expand rapidly enough.<sup>27</sup>

## Oriental Aquarium

Oriental Aquarium<sub>in Singapore</sub> produces ten percent of the world's export market of 300 varieties of aquatic plants. The plants are harvested and shipped fresh under phytosanitary conditions. It has its own tissue culture facilities. It is well poised to capture a bigger slice of a rapidly growing world market.<sup>28</sup>

## Commercial Greenhouses

### The "Ellgrow" hydroponic system

The "Ellgrow" hydroponic system using oval pipes has an attractive rate of return on capital on microfarms around Brisbane. On a site about the size of a house building block (a quarter acre or about 0.17 of a hectare) an investment of about AUS \$30,000 enables a hydroponic grower to grow and harvest hydroponic produce worth about AUS \$130,000 a year.

The net return, depending on cost control and marketing skills, tends to be from A\$50,000 to A\$75,000 a year. The quarter-acre, open-air units can be operated easily by a couple, especially one with children prepared to pitch in to help with daily chores of planting out seeds and picking and packing.

On the downside, there has to be a seven-day-a-week time commitment. But such microfarms around peri-urban areas, or on commercial rooftops in shopping strips or shopping malls, could be the future for a great deal of fresh vegetable production.

A similar microfarm may soon to be set up in Mt Gravatt, a Brisbane suburb, on a purpose-built roof decking. In a feasibility study now being completed, the "Ellgro" system is being included with vermiculture and aquaculture.

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<sup>27</sup> Office (215) 427-2702, CSA Philadelphia Fair Foo  
2501 Cumberland Street, Philadelphia, PA 19125

<sup>28</sup> Eu It Hai, Managing Director, O. A. c/o Primary Production Dept. Ministry of National Development, 5 Maxwell Rd #03-00, Tower Block, MND Complex, Singapore 069110

## Inuvik Greenhouse

The Inuvik Community Greenhouse is located in Inuvik, Northwest Territories, just above the 68th parallel, roughly



2 degrees north of the Arctic Circle. It is home to the Community Garden Society of Inuvik- a non-profit organisation formed in November of 1998. This greenhouse is probably the most Northern commercial greenhouse in North America, and the largest community greenhouse of it's kind on the planet.

The greenhouse was adapted from an old Quonset style arena that has been converted by removing the tin roof and replacing it with polycarbonate glazing. A second floor was added to one end of the building and a separate 4000 sq. ft. upper greenhouse was build for commercial purposes. The community part of the greenhouse sits on top of

gravel on the main floor and is about 12,000 square feet. Gardeners grow vegetables in 74 raised planter beds, built on top of the gravel floor.

The greenhouse helped develop community and has attracted a wide range of people including experienced gardeners. The purpose of the greenhouse is to ensure a more successful harvest of vegetables and to allow a greater variety of crops in an area where fresh produce is often unavailable and can be very expensive.

The summer of 2000 was the greenhouses first year of full operation. The commercial greenhouse, staffed with 2 employees, produced a large crop of bedding plants and starter veggie plants for early June sales the commercial greenhouse shifted to hydroponic tomato and cucumber production. This was less of a success, but did show promise for future years as the bugs in the climate control systems get worked out. Downstairs, in the community plots, people were planting out as early as the first weekend of May and gardened until the beginning of September. That, coupled with our 24 hour sunlight, we've at least got a growing season indoors similar to that of southern Alberta. (Young, 2002)

## Aquaculture and Bioponics

### The God's Gang Worm and Fish Project

A vermiculture (worm-growing) and aquaculture (tilapia fish) operation was, in June 1999, located in the refurbished basement of a high-rise building in one of the city's more notorious public housing projects, the Robert Taylor Homes, on Chicago's South Side. In autumn 1999, the Planting Dreams Worm and Fish Project was forced to relocate by the Chicago Housing Authority (CHA) as part of its plan to demolish the structure. The project has now relocated to the basement of the Taylor Homes building next door.

The Worm and Fish Project is staffed by teenagers living in Taylor Homes, and is part of a larger organization, God's Gang, begun by local women as a community outreach program by an adjacent church. Alison Meares Cohen of the Chicago office of Heifer Project International (HPI), trained the youth—presently five boys and girls—in the growing and selling of worms, and in the production and packaging of worm castings. HPI contributed \$14,000 to the effort, the CHA provided the remodeled basement space free of charge, and the Greater Chicago Food Depository donated over \$3,000 in organic vegetable waste for worm food. Castings produced in the 75 worm bins are sold in one, two, and three-pound bags at the Daley Plaza farmers market downtown (*Appendix B, Figure 9*). In 1999, approximately \$1,500 worth of vermiculture products were sold. These included the castings (used as compost for vegetables, annual flowers, shrubs, berries, and rose bushes), worm beds, and start-up vermiculture kits.

In another part of the basement, 55-gallon plastic tanks are used to raise tilapia fish acquired as fingerlings from the University of Illinois. The aquaculture business plan is to donate the mature fish to food pantries in the initial years of the project, then later sell them to supermarkets to generate income. Tilapia take eight months to grow to full-size, weigh between one and two pounds, and are popular in Asian cooking.

**Source:** Jerry Kaufman and Martin Bailkey. 2000. *Farming Inside Cities: Entrepreneurial Urban Agriculture in the United States*. Lincoln Institute of Land Policy.

## HPI Project

In Chicago's predominately-Hispanic Pilsen neighbourhood on the southwest side, twenty families are planning to raise tilapia fish in the homes of women who have recently immigrated from El Salvador. Some of the fish will likely be consumed by the families of participants, while the balance will be sold for to supplement family incomes. HPI (Heifer Project International) is providing \$9,000 annually over a three-year period for this project.

**Source:** Jerry Kaufman and Martin Bailkey. 2000. *Farming Inside Cities: Entrepreneurial Urban Agriculture in the United States*. Lincoln Institute of Land Policy.

## School Gardens

### Grandview Woodlands School

Vancouver's Grandview Woodlands School has undergone an intense landscape makeover in recent years. Working with a landscape architect, the traditional school landscape has been transformed into a highly ecological, learning landscape.



**Figure 12-12: Grandview Woodlands School, Vancouver.**

### **Pocket-Sized Farms School Garden Program, London, Ontario**

Lifespin, a non profit, community-based organization in London, Ontario runs “Pocket-sized Farms”, a school garden program operating at a handful of elementary schools in London, Ontario. The focus of the program is to create organic gardens on otherwise barren portions of the school landscape, teach children the skills of organic gardening, and use the food grown to teach nutrition and healthy meal preparation. Both standard and heritage seed varieties are used and seeds are saved from year to year as a means of preserving heritage varieties. The gardening activity is supplemented with trips to nearby organic farms where the children learn about agriculture on a larger scale.

### **Micro-Livestock**

Livestock in the city is an ‘unmentionable’ that is common practice. Mega-cities [over ten million] such as Mexico city and Cairo report livestock rearing as being more common than fruit and vegetable production as commercial and hobby urban agriculture.

### **The Heifer Project**

The Heifer Project began a livestock rearing project in Chicago and Milwaukee, in partnership with local churches and community organizations, in the mid-1990s with support of the Kellogg Foundation and others. Prime lines of production are bees, earthworms, fish [tilapia], and mice.

Worms are raised for composting food and other waste and for anglers. Mice are raised for medical research and pets. Fish are raised for restaurants and home consumption. Bees are raised for their honey and pollination of urban fruit trees, vegetable gardens and greenhouse crops.<sup>29</sup>

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<sup>29</sup> Roger Cooley, Heifer Project Int. – Urban Project, 1703 West Division St No. 2  
Chicago, IL 60602, Phone 1800 422-0474



## Commercial Food Processing Facility

### Field to Table Incubator Commercial kitchen in Toronto

About ten years ago, Field to Table, a non-profit organization dedicated to building sustainable community food systems, constructed a 4500 square foot incubator commercial kitchen in Toronto. Most of the cooking equipment (all natural gas fired) was donated by Consumers Gas. In addition, the kitchen receives \$70,000 per year in financial assistance from the Toronto Economic Development Corporation.

Tenants typically pay \$20/hour to use the facility (although the Program Coordinator, Mary Lou Morgan, indicated that the market rental rate for the facility would be about \$50/hour. The facility generates about \$35,000 in revenues/year and is available half time (the other half of the time, the facility is used by Field to Table to cater meals for its other programs). (Source: Pers. Comm., Mary Lou Morgan, Program Coordinator, August 28<sup>th</sup>, 2002). More information at: <http://www.foodshare.net/cook.htm#5>



Figure 12-13: Foodshare Kitchen Incubator. Photo: Foodshare Website

## Eco-industrial Food Complexes

### Intervale Community Food Enterprise Centre

[www.cedoburlington.org/intervale\\_community\\_food\\_enterpr.htm](http://www.cedoburlington.org/intervale_community_food_enterpr.htm)

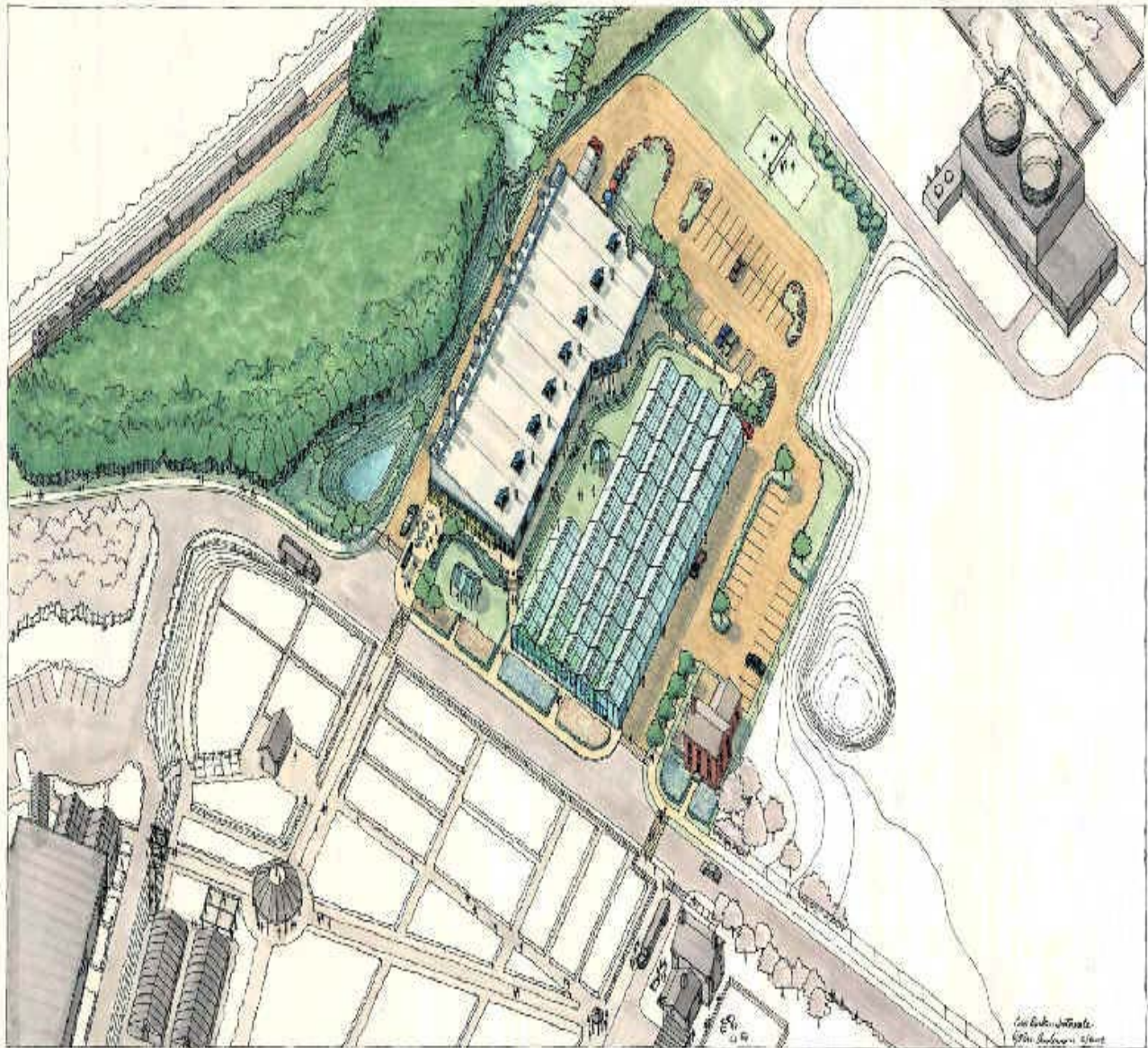
The City of Burlington, in partnership with the Intervale Foundation, the Compton Foundation, and the US Department of Energy is developing a state-of-the-art facility that combines food processing, food waste treatment and aquaculture using the principle of living machines. The City's aim is to harness the economic value found by linking organic agriculture, sustainable building design/architecture/engineering, local employment, small business development, and quality, affordable food.

The facility consists of two parts.

20,000-ft<sup>2</sup> of commercial building space for food processing, a community kitchen, environmental research and education facilities.

21,000-ft<sup>2</sup> of organic food growing in commercial greenhouse facilities.

This 10-acre project is geared toward filling specific market niches for new business enterprises. Its location in the Intervale, a 200-acre agricultural area in Burlington, allows existing agricultural activities to benefit from access to the facility and ensures support for new business enterprises. Shared cooperative business services, such as production modules, pressurized steam, ample power and water, are tailored specifically for businesses looking to move into or expand production.



**Figure 12-14: Intervale Community Food Enterprise Center. Photo: City of Burlington Website**



<http://www.oceanarks.org/urban/>

The living machine is a greenhouse-based, re-circulating "aquaponics wetland" that converts food waste into high-protein feeds for fish production (aquaculture) and nutrients for hydroponic vegetable and horticulture crops.

Food wastes from local restaurants are used as feedstock for aquaculture. In addition, the waste from the fish are food for the plants and drive other important biological processes within the ecosystem

Figure 12-15 : Images from Ocean Arks website



## Farmers Markets

### East Vancouver Farmers Market

This successful Farmers Market operates one day per week during the growing season on the Trout Lake Community Centre parking lot in East Vancouver.

The Farmers' Market Society was established in 1995. It's mission statement is: to foster community health and economic development through the creation of a venue where community members have greater access to safe, healthy, locally produced, environmentally friendly food and where B.C. growers and craftspeople can market their goods directly to urban consumers.

In 1995 the Society developed a pilot project which ran for 11 (Saturdays) weeks and averaged an attendance of 900 people over a 4 hours period. In 1996 attendance was 1500 over 5 hours and ran for 24 weeks. The Market involved 100 different growers, artisans and small-scale food processors. They also had a toy exchange and a drop in table for backyard gardeners with a surplus to share. Two tables

**Figure 12-16: East Vancouver Farmers Market**



were reserved for community agencies to interact with the public.

The Society reports that about 60% of those who attend the Market live between Wall, Nanaimo, 33rd, and Fraser, 80% live east of Main Street, many walk. People stay on the average of an hour.

The Society, in keeping with its community based goals, has developed alliances with a number of local agencies. Three of these organizations, the Vancouver Health Board, Kiwassa, and Reach Community Health Centre, have programmes to enhance the level of awareness of good nutrition, eating habits and food preparation. The Society offers incentives, food coupons and education which, in turn brings the participants to the Market. The Society also has a number of other initiatives designed to educate and bring the community together.

#### Details of Operation

The total number of vendors is limited to 40; up to 24 farmers, 8 artisans, 8 micro-food processors. All participants sign an agreement and meet criteria related to quality, variety and Society purpose. Only vendors who make, bake or grow their own product are permitted. The Agreement regulates pricing. All prepared goods are labelled and meet Environmental Health regulations. All agricultural methods are identified.

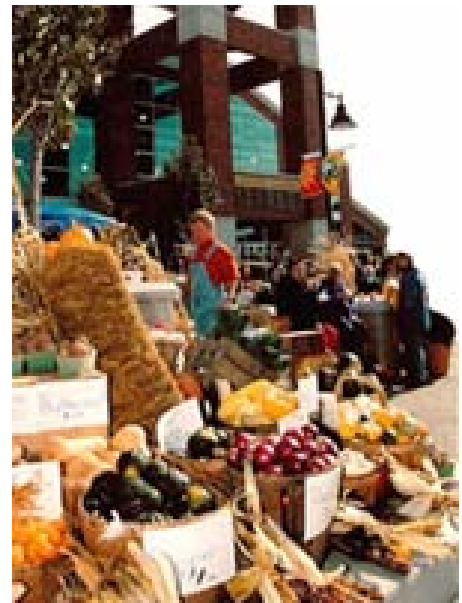
In 1996 the Society had a \$24,000 budget. There is a rental fee of \$25.00 for farmers and \$15.00 for the other two categories, a seasonal total of \$14,000. In 1996 the Society was able to pay a \$10,000 honorarium to the principle organizer. The budget (Appendix B) also covers insurance, publicity/posters, fees, program and administrative expenses. The Society had a Community Economic Development grant of \$16,000 in 1996 and is seeking additional funding for 1997. They also had a student grant. The rest of the preparation and the on site operation is handled by 12 Society volunteers (1500 hours). source:

<http://www.city.vancouver.bc.ca/parks/bdpackg/1997/970310/farmkt.htm>

## Covent Garden Market

A public market has operated in London, Ontario since 1845 but the building that housed the market in recent years became run-down and poorly attended by the late 1990's.

The new market opened in 2000, features fine food dining, produce stalls, flower displays, artisan craft stalls, kids activities and an outdoor public plaza. This plaza is home to an outdoor farmers market on Thursdays and Saturdays during the growing season and also doubles as an ice rink during Winter months.



## 13.0 Appendix C – Notes from Workshops

### Brainstorming Session Notes with Urban Agriculture Experts

MONDAY, AUGUST 19, 2002

#### IN ATTENDANCE:

- Rob Barrs, Meeting Chair, Lead Consultant, Holland Barrs Planning Group
- Herb Barbolet, Executive Director, Farmfolk/Cityfolk Society
- Erik Lees, Landscape Architect, Lees and Associates
- Derek Masselink, Director, UBC Farm
- Mark Robbins, Regional Agrologist, Ministry of Agriculture, Food and Fisheries
- Ralph Perkins, Planner, liaison to GVRD Agricultural Committee
- Gord Tycho, Holland Barrs Planning Group (notes)

#### MINUTES

- Introduction
  - SE False Creek ODP; previous studies on transportation, energy, solid waste, and water (urban agriculture is the latest study)
  - SEFC intended as a “model” - hopefully practices here will show up in other Vancouver developments
  - Brown field site; contaminated soil; all buildings to be demolished except for those with heritage value
  - Intended to be a complete, mixed use community (predominantly residential)
  - 11,000-14,000 residents, 6,000 units, 250-300 employees, elementary school, 26 acre park, neighbourhood house.
- Challenges (and responses) – Rob B. highlighted some of the perceived challenges to urban agriculture at SEFC and participants responded with comments.
  - Lack of space to grow food/fragmented space for example the park has many land use demands on it from a variety of competing interest groups. *Not sure that Park use will be as high as anticipated. Access is not that easy – mainly Waterfront path use, but low internal use of Park. there is a niche market potential (restaurants, etc.) that could work well with fragmented space*
  - High value of land for other uses/low economic return for agriculture – *urban agriculture as a commercial land use cannot compete with most other land uses which generate a much higher dollar value per acre. Therefore, urban agriculture can only thrive at SEFC if supported by the City because of its other benefits. The City might choose to support commercial urban agriculture at SEFC by zoning land specifically for urban agriculture in the same way that industry might be supported even though residential development would attract a higher price for land.*
  - Competition with rural growers and imports – *urban agriculture as a commercial activity can only survive if it can be done at a profit. Price thresholds are set by market place. Rural growers have the advantage of larger scale, lower taxes and cheaper land. Foreign production is often*

*artificially subsidized making it difficult for Canadian rural farmers, let alone urban farmers, to compete.*

- Land-use conflicts – noise, dust, odours, untidy – *this is a design issue*
- Security – theft, vandalism – *rooftops are very secure, again design can overcome, community gardens continue to experience some problems in this area.*
- Technical Limitations –skill shortage – *there is a shortage of skilled urban farmers. UBC farm and FFCF both have experienced this and trying to address through training programs. It can be technically very difficult to get high levels of quality production from a rooftop situation. We have to recognize this is a fledgling field of study and not enough work has been done to generate high levels of competence yet. This could be an opportunity for SEFC*
- Lack of interest in working with the land – especially when urban residents have high pressure, time consuming careers. *However, generally seems to be a high level of interest in Vancouver – community garden sign up rates are growing. The work of FFCF and others has catapulted food issues to a high status in Vancouver compared with other Cities.*
- Legal Liability – *recognized that this is an issue in some cases but can be overcome with sensible design and clear thinking.*
- Contaminated soils – *City is planning to concentrate all contaminated soil in one spot in the park and then “cap”. Not sure of exact technology. Soil testing for residues will be important if farming in native soil.*
- Perception as inappropriate in City – *despite some changes in perception about the “appropriateness of urban agriculture” there is a lingering sense that this is better left to rural folks. However, once excellent examples are developed, this will fade away.*
- Regulatory Barriers – *zoning restrictions, height restrictions, design guidelines, health laws and bylaws may make urban agriculture difficult from a bureaucratic standpoint. However, regulatory change is possible for SEFC.*

Other Comments arising from challenges discussion:

- what recommendations do we provide to the City in regard to what role the site plays in relationship to the rest of the City and indeed the region?
- We need to think about a ‘marketing strategy’ for urban agriculture in Southeast False Creek (permaculture, landscaping, sale of sites) to show that it can generate a lot of interest amongst many people these days – in deed there is a great enthusiasm for homes that provide practical opportunities that urban agriculture offers.
- Park Board policy: they prefer ‘group’ gardens more than ‘individual’ plots since this is in keeping with the ‘public’ nature of the park
- We need to design for multiple objectives if the Parks Board is going to approve urban Agriculture uses.
- What is our working definition of Agriculture?
  - How are we defining agriculture?
  - What are we growing?
  - What about non-food items?
  - Do we focus only food related agriculture or whatever is commercially viable (including floriculture, medicinal herbs)? Food is most important.
  - Should we include processing/distribution in the definition (for example, we could consider placing a commercial juicer in Southeast False Creek) Yes.

- Options
  - For best results, we need to make the plan flexible – i.e. need to design for multi-functionality so that if urban agriculture fails we, the space is still useful.
  - Governance and stewardship – who is responsible if someone walks away from a garden plot/commercial venture?
  - Although transportation is difficult, the park space per capita is quite low for the area. Consequently, park will be highly used.
  - Perhaps the site doesn't have to take on the challenge of growing all its food, but rather develops a relationship with off-site growers – perhaps we develop a farmers market that invites farmers from the Fraser Valley.
  - Organic vs. Non- organic? Agriculture should definitely be organic but may also allow hydroponics which the Organic movement is reluctant to allow organic status because it doesn't involve soil building – other jurisdictions allow hydroponic organic such as however, such as California.
  - Retail? Emphasize a food purveyor in the area (like Granville Island)
  - Urban agriculture could be great for the older population (hobby, supplemental income, etc)
  - Expand options – not just traditional food crops but medicinal, floral, etc.
  - Herb comments on an off-grid high rise project
  - Rob points out the ecological footprint of greenhouses (very high). What do we do with the building heat (i.e. how can we utilize it?) to improve “sustainability of high tech greenhouses”?
- Examples
  - Big Bend – 4 crops per year, propagate, hand transplant, \$35,000 wholesale
  - What about soil quality? How will soil contamination effect the yield and health safety of any potential crops
  - Labour intensive, constant growing, upscale market, restaurants
  - L.A. micro-farming example: \$200,000 /acre
  - Personal vs. public farming? Do we need a Coordinator? Training? Education? Most likely, the answer to these questions is yes
  - Perhaps some sort of cooperative marketing strategy is called for
  - What about safety mechanisms? (in lieu of 911, etc.) It is important to leave the soil open for future emergency uses. We should turn the question around – traditionally, we ask ‘how much farm space do we need to set aside’. Rather, we should ask ‘how much urban development space do we need’?
  - Herb wonders about the aesthetics of greenhouses. Something to consider in a high end development project – different approaches, plastic, glass, polycarbonate.
  - Village Homes in Davis, California has some good examples of suburban agriculture
- Subsidy versus Public Good
  - The argument of subsidy vs. public good. Subsidy is a dirty word in development issues. We need to be careful. Should we consider urban agriculture as a common public good? Should it be subsidized in a manner similar to our existing park systems?
  - SW Marine Drive as an example → possibilities for providing space on the outside for growing a variety of things
  - Perhaps community amenities need to start including growing areas
  - This is a multi-layered problem
  - We need to remember that nothing does one thing. Places need to be multifunctional
- Options for food distribution:



- link to Granville Island Market (supply and exchange)
  - Tree fruit project
  - Central place with facilitator
- UBC farm is trying to localize processing and production
- Urban agriculture could be a great way for seniors to subsidize income
- Davis, California apparently has a good example of food in a park
- Buying Clubs are huge in Japan
- There is a local history of agricultural production in the 70's and early 80's
- Commercial Market Gardens
  - The Waterfront Hotel is a good example – it represents a corporate market!
  - The Body Shop is treating all their wastes
  - Chocolate Factory
  - Urban Herbals, LA
- Turning Waste into Food:
  - North Vancouver Island operation (hog fuel waste/heavy metals)
  - The SE False Creek water study: essentially there is not enough rain in the Vancouver area to enable us to harvest a lot of water
  - Perhaps we should consider an innovative augmentation with grey water
  - Concerns over grey water: contact with humans – underground seems to be the way to proceed with grey water
  - How do we utilize heat from buildings as a potential energy source for urban agriculture
  - Newfoundland example – closed system with fish – fish wastes go back into the gardens
  - Compost toilets – Abbey Rockefeller and opportunities for 'waterless toilets'
  - Animals in the city – explore but be cautious
- Lets try to leave the door open (in regard to by-law recommendations – i.e. zoning and health)
- Commercial Greenhouses
  - Driving costs – can tolerate some inconveniences if there are incentives
  - High value crops
  - LEED incorporation in S.E. False Creek
  - Karl Hahn – greenhouse specialist
  - Multifunctional space
  - We should tie into Cities Plus and/or Growing Green

#### Rob's Notes

- What happens to the land if initiative fails?
- How to deal with failures in the market
- technical limitations
- Challenges
  - Park's Board – rivals use of public land
  - Use the landscape to connect uses
  - Integration is important
  - Connectivity with other urban and suburban initiatives
- Economic opportunities → value in outdoor, productive space
- Focus also on floriculture, botanical uses, medicinal, processing, distribution
- Possible link to Eco-café proposal or another retail food outlet
- Flexibility of space is important

- Perhaps separate out park from other spaces – it is a special case
- Long-term stewardship is important – how to ensure
- Most don't see high use of park except on Waterfront Edge
- Lets make SEFC a true demonstration to set this place apart from others
- Need to establish clear goals and principles
- Inside buildings/green high rise
- Contact BC Hothouse Growers
- Microfarming – very high value from small spaces
- Aesthetic issue → plastic cloches and poly tunnels – very economic but aesthetically ugly, high tensile structures are better.
- Village Homes, Davis – case study
- Fairmount Waterfront Hotel – case study
- Options/pro/cons/case studies
- Highest and best use argument
- Gardening very popular hobby/pastime
- Need studies that illustrate value of growing space/gardens
- Marketing of development issues
- Not enough urban agriculture entrepreneurs – lack of skilled people. FFCF and UBC farm working on that
- Criteria: include “is it realistic” both dollars and practicality
- Options: Link to Granville Island market
- Farmer's Market – not just for Farmers but for home growers, micro processors etc. Create a mechanism for income patching , especially for lower income people.

#### Urban Herbals – Derek photos

Livestock – possibility with having chickens (slaughter is a problem). Small scale abbatoirs, precedents. Don't abandon the idea of small livestock without looking at it a bit more.  
Connecting commercial wastes with livestock may be fruitful.

- Commercial Scale
- Land cost
- Heat
- Retail vs wholesale
- High value crops
- LEED rating
- Design to incorporate multiple functions into roof top space
- Growing green project
- Cities Plus project
- Perhaps have a TEAA (total effective agriculture area) – requirement – based on total area \* number of participants etc.
- Present scenarios of productivity – how much food could be produced using each approach to urban agriculture.



## Notes from meeting with Development Community

Sept. 19, 2002

### Attending:

David – Sustainability Ventures Group – retailing and processing options  
Kolvan Yuh – City of Vancouver Real Estate – land owner  
Robin Petri – City of Vancouver, Projects Branch  
Brian Crowe – City of Vancouver, Projects Branch Manager  
Ian Smith – City of Vancouver, Senior Planner, Central Area Planning  
Ann Bancroft Jones – Polygon  
Bob Heaslip – Brook Development Planning  
Eric Lees – Lees + Associates Landscape Architecture  
Mark Holland – Holland Barrs Planning Group  
Rob Barrs – Holland Barrs Planning Group (facilitator)

Phase 1 – workshop - Examining role of food related activity in a high density urban community

Looking at various approaches to food related activity – discussing issues and concerns in order to identify solutions

What might be the concerns of developers?

- Qu: Why are we focussing on food when thinking of urban agriculture – agriculture is not only food
- Not clear on the terms of reference – was not expecting the discussion of urban agriculture to be solely focussed on food production etc.
- Why are we off on this specific tangent (developers perspective)
  - suggests the need to look at liability issues – ex leaky condos
  - anticipates huge concerns from developers
  - suggests it would be helpful to know the terms of reference – make explicit the reason for choosing the route of 'commercial activity to grow food'
- Brian – clarifies that these were the initial expectations of the city – emphasis on the personal - the city envisioned the commercial as less likely than the personal
- Eric -puts forth argument that agriculture by definition includes some part of the food chain
- Mark - this is an attempt at looking at the implications of food system flow
- Can we define rooftop gardens as you speak of them in this study as podium rooftop gardens?
- General message- podium rooftops are more appropriate for growing
  - there is a strong inclination to podium rooftops as more viable
- These are all private or institutional sites - this poses a problem from the developer's perspective – in the case of private owners – who will manage these?
- If the city wants to do this on site – perhaps we need to look at this in terms of public and private – it would be helpful to breakdown what is achievable on private vs. public sites.
- Developers perspective – wonderful sustainable ideas – but what does this mean for the developers? Need to keep practicality in mind.
- Some believe that this is not feasible for the development community

- Green roofs are of interest – but are they going to be mandated / and can they be?
- How do you (or do you at all) enforce food production?
- City perspective - Intention is to create interest and make it so that people can engage in urban agriculture
- City wants to know -What can the city do to enable those interested in engaging in urban agriculture
- -The reality (in considering cost) is going to generate densities that lose sustainability features
  - there is no evidence that the market cares about sustainable projects
  - feels that we need to be careful of adding on more layers of complications for strata owners, for example:
    - very different management issues arise if growing food – for instance who gets the crop?
    - says people complain even of the aesthetics – who will maintain it – how it looks will be very important
- Comments on rooftops:
- concerns of cost and how you control water
  - ex: port moody created whole open spaces on podium roof 22 acre site
- Bob suggests - what you have here is something that can be approached through hierarchy – look at the whole community, what is the aim in order to do a combination of policy guidelines and framework
- one approach is to create a 'bonus' system for incentives
- sees opportunity not only for food, but also flowers etc. that can also be marketed
- suggests considering various locations – whether community school, yard etc.
- suggests that we have to think in terms of practicality but also in terms of what we could do to educate the public, give them opportunities
  - ex: port moody – wanted walkway with educational opportunities – linked to streamkeepers groups to produce educational pamphlets etc.
- commercial side of things – opportunity arises if you designate or zone specific sites for kin markets – maybe get the community involved or maybe solely commercial.
- Incubator is an excellent idea – people like the social aspects of growing as well as income generation
- Dave also enforces social importance
- Point is that you have to make this realistic but you can put out lots of carrots to promote interest, if consumer is not interested the study is not lost, this is also a great marketing opportunity – to be seen as leading edge (this is a good incentive for developers)
- Water damage is concern – but it is manageable (Fairmont hotel is a good example of this)
- – idea of being practical, able to implement
  - also important to think of timing, somebody should be putting their mind to phasing ( because much of this will not happen for years to come)
- Good to have in next phase of report:
  - small sites, first sites, existing parcels of land and their constraints
  - 3 owners are ready to go
- distinction of public and institutional
- we need to get this message to the development community – the comfort level of the development community is low, perhaps these examples are too academic and developers can't relate
- if we appreciate the fact that people have been waiting for zoning – put onus on developers to be more creative – what bonuses can we create for them

- parallel – didn't have recycling 15-20 years ago – if we look at this as example - we need to come up with something that is realistic and that makes it worthwhile for developers
- key – have a demonstration location, showing interactive approach
- this is a big leap to make – find what we can apply to higher density places, providing related opportunities
- the difficulty- this hasn't happened at the private level with higher density
- Questions to ask / suggestions:
  - what could be some appropriate bonuses – (we can't mandate this process)
  - 'trying to design flexibility' is very important
- Fear – idea that we are getting into an environmental performance plan – another layer of bureaucracy/approval will drive developers further away
  - have to make this easy for people to do, because those that are coming along do not want to do it.
- Another concern – infrastructure will change over time
- If there is some way to target a specific location on city land – if somehow you can get that going right away you can stage it to get people interested – this would be an automatic marketing opportunity for the developers, and it won't even cost them that much (doesn't have to be owned by the municipality)
- It is suggested that it would be challenging to have part of the city site for urban agricultural use. There is a big problem with cost – with the current strategy, it is essential to keep the project on edge, it can fall very quickly to not being seen as feasible.
- In order to risk manage this – all we can do is throw some ball, otherwise we will trigger many other costs – this provides an extremely high level of challenge
- Dealing with ground water – you could have private pots, but whatever goes in there will go into the ground water (and location is so close to the creek)
  - this needs to be considered, also applies to 1<sup>st</sup> and 2<sup>nd</sup> avenue projects, whatever goes in there at the source can go into the creek.
  - this is case for both private and commercial, we would need to guarantee that there would be no contamination into the creek
  - however, it is not impossible to get these approvals
- we need to really look at characteristics of the land and site – contaminated soils are an issue, anything that bothers MOE will delay...
- Ian- this is a sustainable neighbourhood (as of 1995) - regardless of what different departments feel, council constantly reminds us of this
  - thinks next council will be even more supportive- but if at the end of the day it doesn't make sense economically, they won't back it up
- zoning was not to be I2, there will be a bonus zoning that will encourage owners to participate in mixed zoning that includes environmental
- we have to define what are the goal posts area and define what we want them to do
- Ian – in phase 2 we need to:
  - look at private lands between 1<sup>st</sup> and 2<sup>nd</sup> Ave.
  - have to start from square 1 with city owned land – if we can't do this on our own land then we have to let it go
  - also need to parcel off area that is FC 1, include city and Translink land and then put together a strategy for the entire piece.
  - need to separate what is more applicable to private lands and what is applicable to public lands
  - need to be sensitive to size of development parcels as they are today, all have diff zoning issues now – we need to look at what this means

- can't do this in isolation of energy and water waste
  - can consider this as part of strategy – to set a certain standard at what you can get approved from MOE etc, and with the things that are more difficult you pass them on as suggestions
- – it is helpful to understand practicalities, what is a green roof – developers need it broken down, the cost etc. (developers will not respond to the academic approach)
  - developers need some of the practical micro details
- Need to add another layer of analysis - different types of built form (wood vs. concrete construction)
- Collecting rainwater into barrel is a very simple and cost-effective solution – people need to be aware of this
- if you can approach your portion – providing a set of guidelines that will get the developers to their comfort level – don't want to put this out as if it is being forced or mandated – need to make it clear that this is voluntary
- Commercial aspects:
  - many code issues are going to be fundamental
- has anyone considered the implications of the site being so close to Granville island?
- several small scale operations thought it would be viable, but the city has too many restrictions
- so what can we do to make it easier to get permits?
- use an incubator approach?
- many of these businesses have a hard time surviving because they are not cheap
- if you choose a model and then approach businesses that are successful – ask them what would make it attractive for them? how could we make this easy for you? for this to happen, would you consider partnership with city?
- customers like 'different' and 'unique' approaches, for ex: idea of food grown on site – such customers are info junkies, myths of origin etc....
- - you will have people wanting to travel to this destination
- City- we are interested in promoting this as 'local'
- need to try to find a spot that will appeal to all components – we need to be sensitive to who is really going to live there
- Emergency food -
  - be careful in saying that this is high end condo development and mixing groups – - careful in the linkage between groups
- Farmers markets -
  - great idea depending on location – uses ex of port moody where private land was used for various types of markets on certain days and certain hours
  - don't give up on markets being on private owned land
  - one of the aims in creating these places is community interaction – thinks you have to start small and make it flexible
- try to speculate on the percentage which will be interested in order to know your target
- also, think of flexible space, for multiple uses – how can we get a better density use out of one site?
- Thinks this can work both commercially and at the community level
  - need to get practical info from engineering department
- Thinks report will be more complete with:
  - idea of general vs. specific

- are we expecting uniform standards with all the buildings or different standards?
- this needs to be clear in report, otherwise will create many problems at the enforcing stage
- Looking for landowner perspective:
- how to frame urban agriculture to make sense to the land owner
- element of timing, demand preference changes with time
- need to know how to reduce the red flag
- Response: you want to set up your hierarchy and state what is required and what isn't and make it very clear why you are doing this and what makes it worth their while.
- have to create excitement about the idea
- set up framework so that standards are clear – and educate through pamphlets etc. with ideas of how strata can be involved in a more sustainable process
- City - environmental performance plan may or may not be required as part of guidelines
- what will show in guidelines is what shows up in ODP
- City needs from you – what should we put in those guidelines
- thinks that to get developers interested we need to show them that this can sell itself – they need to see what the benefit is for them
- need to create a doable report card
- provide carrots all along the way, make it small steps so that they don't feel like they're being dragged through it
- the developer is just the flow-through instrument - developer needs certainty on 2 factors - the market and financing
  - 3<sup>rd</sup> factor – they will also want a higher return for their money
- the argument of density has been created by developers because of how much profit they want to make
- need to find a way so that the stakeholders are not competing with each other
- Info on market analysis factors – where can we access this kind of analysis?
  - look at it from 2 sides – how can we do this a little different (cost) (Paul Rollo) and the other side, the consumer side (Mark Trend )
- An added aspect to this: as well as informing you on trends, it will allow you to show how you can market this stuff – illustrate the side-benefits to the buyer

## Stakeholder's Workshop Notes

September 26, 2002

### ATTENDING:

Devorah Kahn - Farmers Market's of Vancouver  
Barb Lindsay - SEFC stewardship group  
Alan Duncan – City of Vancouver Planning Department  
Susan Kerbis - Environmental Youth alliance  
Muggs Siguirson - Strathcona Community Gardens  
Uta Aarj - City of Vancouver, Landscape Architectural Group  
Tilo Driessen - Parks Board  
Angela Gonyea – Central Area Planning  
Ian Smith - Central Area Planning  
Mike Levenston – City Farmer  
Derek Masselink - UBC Farm  
Danielle Lukovitch – GVRD  
Robin Petrie – City of Vancouver Engineering Department  
Consulting Team

### REGULATING AND VIABILITY:

- Will there be the problem of needing approval (of community gardens) every year?
- How viable is this?
- Can you place this study into context – where it fits into the larger SEFC ODP?
  - preliminary ODP in February
  - initial public review will probably begin March/April
  - ODP will set the basic character
- {Tilo}: 2 principles that are important:
  1. The more the idea is connected to other ideas that happen in the same place the stronger the chance the idea will become reality
  2. *The more the ideas cannot interfere with other functions on the site, the higher chance of success.*

### DESIGN / LAND CONSIDERATIONS:

- Have you explored retrofitting existing buildings (now and for the future)?
- Keep food processing in mind while designing buildings
- Is the use of park space being considered for urban agriculture?
- Is there an opportunity to identify what kind of land use is available (is it broken down)?
- In terms of the 26 acres of parkland – will there be space for wild native habitat for birds (which are necessary for gardening)?
- We should be making use of land that is 'free'
- {John}: at Mole Hill we were able to reduce parking and use land as community gardens, this could be an option for SEFC (and this could be viewed as 'free' land)
- The 26-acre parkland will also respond to the needs of the Mt.Pleasant area

- There are many opportunities (and the Parks Board is a little hesitant)
- Comment on the need to start thinking about land that can be used around the streets

#### **SPECIFIC LAND CONSIDERATIONS:**

- Rooftops: faucets for irrigation, access
- If thinking of hydroponics – then why use good land – use rooftop gardens for this
- The question of toxic landscape – the worst contamination is in the west side of site
- We can assume that 2/3 will be clean
- {Tilo}: we cannot have a toxic park
- It would be useful to flag the toxic areas so that they are recognizable
- 50 years into the future we will need to be able to identify health and being in order to use these areas
- Question regarding the cycle of production waste – how do you see this study connecting to the other studies?
- How can this plan tie in with the other plans to maximize the circularization?

#### **COST - BENEFIT:**

- Are you doing any kind of assessment of the space available (public, semi private, private) to see what is in fact feasible?
- Land cost - the city doesn't treat public land that is free for public use, they see it as an investment
- {Tilo}: the more you take land cost out of the discussion of urban agriculture, the more you will succeed
- {Derek}: there are a number of other costs that need to be considered - if we look at land values and what people want, there needs to be a balance of various uses
- Also need to take input costs into consideration - this is a big part of the picture
- City needs to consider subsidizing this activity so that creative activities can happen

#### **SOCIAL CONSIDERATIONS:**

- More encouraging of a collective approach as opposed to an individual approach
- Not enough food can be produced for all that live there, how will it be determined who gets access etc.
- {Mugs}: policy for Strathcona – everyone who comes is entitled (try to encourage local residents)
  - to get on wait list, need to participate work party
  - there is a certain amount of rotation that happens/people weed themselves out etc.
- fee is \$10/year
- When you think about the cost of city land, this is not economically feasible. Therefore, the city needs to ask itself if it wants to encourage urban agriculture for the public good
- Re-emphasize urban agriculture in terms of social sustainability such as community building (urban agriculture has the function of bringing people together – we need to value its important social role)

#### **GROUP DISCUSSIONS: ISSUES, CONCERNS, AND IDEAS**

##### **GROUP 1: NON COMMERCIAL FOOD PRODUCTION: PRIVATE GARDENS/COMMUNITY GARDENS:**

- Discussed balcony gardens - for herbs etc.
- Talk of the need for infrastructure throughout - where space is provided as well as water hook up to make it as easy as possible for those who want to do it

- Creating access and providing infrastructure are important
- Building the landscape so that people are able to use it
- Landscape design should involve the residents as much as possible
- Talk of blackberries/blueberries/edible flowers
- Not to worry if it is not a huge success right away - to anticipate changes
- Discussed schools and community centre's - infrastructure should be in place there - and programming should consider this (this needs to be considered ahead of time)

**GROUP 2: FOOD PROCESSING:**

- The idea of a shared kitchen was immediately jumped on, there needs to be a business case we need a champion to do this
- Someone needs to take on exploring the business planning of this (such as a sophisticated NGO) to see what really might be possible
- Is there a demand for this and how do we do it?
- Identified that there is a food processing network in BC, so there is an existing infrastructure (examples in Kamloops and Kelwona)
- See an opportunity for all to use it (ex: see a large demand for cooking classes)
- If combined with a school, it could have a significant educational role
- Has a huge potential for bringing people in with various interests or skills in the community
- All three ideas ended up being merged (the incubator idea came up right away with a preference that the scale be local)
- There are certain niche markets in agriculture that would fit very well in certain spaces in SEFC, we should identify these
- Emphasis on multiple use complexes: establish a facility and lease it for multiple uses (if it is designed this way)
- Need to consider when these ideas come into the planning process?
- The shared kitchen could be a part of a larger idea, tying together various functions
- Don't separate food production, combining commercial and industrial
- Question of whom will use it, there is already a demand (network)
- Integrating this idea into a community centre or school is also an option
- Eco-industrial complex – idea that having a waterflow would be useful
- Think that the impact of flow of a kitchen would not be more significant than a restaurant kitchen
- Regulations that are in place now will create challenges later (particularly health regulation questions)
- At the end of all of these plans we will have to either find a way to get around regulations or change them (we have to try not to be prescriptive)
- Consider trade-off of rooftops vs. permeable (lose some attributes such as social)
- Considerations for the Eco-industrial complex idea:
  - the commercial rooftop option loses the social value
  - think that it is the permeable soil that gives the most options
- Question regarding the challenges in integrating food processing within a high density environment:
  - we would want a place to sell it there – local production more than business
  - there could be loading bay capacity in the commercial area
  - if could be several companies that could share the loading bay
- Considerations for the Food Incubator idea:



- Possibility of a training / technical collage (this could be a good program for community facilities such as chef training or opportunities for places such as VCC to use facilities /provide training etc. could be created)

**GROUP 3: FOOD DISTRIBUTION / RETAIL:**

- See facilities as bases for various food-related organizations, a place where such organizations collate their administration
- Talked about options such as a grocery store, shouldn't be just a convenience store but one that provides residents with all they need
- Raised concern that grocery stores create traffic congestion, how would residents feel about this?
- Idea of a market in a space that could be multi-purpose (such as a farmers market in good weather / concert hall in poor weather)
- It is suggested that there is probably demand for a farmers market twice as large as Trout Lake, this needs to be looked at
- Question as to whether it is possible to contribute food off the site (emergency)
- Don't see enough room in Vancouver for another Granville Island, think any plan for a market needs to be sensitive to Granville Island
- Perhaps there is room for a producers market as well as a farmers market?

**GROUP 4: COMMERCIAL FOOD PRODUCTION:**

- Potential of operating a market garden see a possibility, though spatial requirements are not that great
- Concerns of a commercial operation and exclusivity of use
- A need for multi-functionality was also raised
- There should be other connections made such as education, training, access
- Raised governance issues, how do you establish the parameters around use?
  - could strata council set these parameters?
  - what about security, which limits public access (exclusivity again)?
  - should we be looking at other areas where land values are lower?
- Exclusivity of use and programming of multi-functionality - issue of using up landscape as opposed to putting it on a building
- If the greenhouse option is going to be super energy intensive, it may not be worth it
- We only start to make the gains when we see the circularization process come into play

**CLOSING REMARKS:**

- 44% of people in Vancouver grow food for their household (City Farmer Study)
- School grounds - policy issues and management issues that impede (child labour and union issues for schools and who looks after the site in the summer)
- Should this be highlighted in the study?

People are so important in this process - the fire needs to be lit in them to support these ideas (we need support for our organizations etc.)

## 14.0 Appendix D – Evaluation Criteria and Matrices

Sections 6, 7 and 8 of this report present a number of options for food production, food processing and food distribution that the City may choose to encourage in the future community at SEFC. Each of the options is discussed according a set of social, environmental, economic and other criteria each of which is discussed here.

The scale of the impact of the various options will to some extent depend on how much land is made available to pursue the option and how much food is produced. If the option of a commercial greenhouse is pursued, for example, it could produce a lot more food than other options based on voluntary labour. This would reduce the number of off-site grocery-shopping trips made by residents and in turn reduce the negative environmental impacts associated with personal vehicle use.

Table 14-1 and Table 14-2 are an attempt to summarize that work in a concise form so that easy comparisons can be made. The evaluation of each option has been done according to the criteria outlined below. For each option we have scored (from –5 to +5) the option based on a qualitative estimate of how it rates against the criteria. For example, the option G1, community gardening scores very positively against the criteria of “social and recreational impacts on the community” and therefore receives a score of “+5”.

Most of the criteria are necessarily qualitative at this stage and are based purely on our professional judgement and experience. Many will remain so, but others may be conducive to a more quantitative estimate in future detailed analysis that is beyond the scope of this study. No attempt at this stage has been made to weigh the criteria or to calculate the total scores for each option as we believe this would give a false impression regarding the accuracy of this evaluation. The numbers are necessarily subjective and are offered only as the basis for discussion.

### Social Criteria

#### Level of food self-sufficiency

How much of the resident’s food needs could be met using this option – i.e. what is the quantity of food produced?

#### Opportunities for Social Interaction and Recreational Impacts on The Community

Some of the options will provide for greater opportunities for involvement by residents than others. Community gardening especially encourages social interaction and is an active, recreational pursuit.

#### Health, Diet (including health risks)

How much does the option improve health by allowing residents to participate in healthy, outdoor pursuits (as noted above) but may also improve the quality and freshness of the food consumed by residents. This is especially true if organic methods are used as organic food production has been demonstrated to increase the quantity of important micro-nutrients (trace elements) in food.

## **Educational**

Various options may offer opportunities for increasing residents understanding of the relationship between the land and food as well as other educational opportunities.

## **Impact On Other Land Uses/Users**

How will each option impact the ability of other land users to enjoy the community?

## **Opportunities for all residents to participate**

To what extent does the option encourage broad participation by the community?

## **Environmental Criteria**

### **Stormwater management**

What are the likely impacts of the options on stormwater management techniques.

### **Use of wastes**

To what extent does the option provide for recycling/re-using solid, liquid, and heat waste?

### **Energy conservation**

To what extent is the option energy intensive or energy conserving?

### **Impact on local travel**

To what extent does the option reduce the need for residents to travel outside the community for basic needs?

### **Water Conservation**

What impact does the option have on the amount of potable water used by the community?

### **Creation of oxygen**

Will the option have any significant impact on the amount of oxygen created?

### **Effect on air quality**

What impact will the options have on local air quality?

### **Biodiversity**

What effect will the option have on local biodiversity? This may include the diversity of non-food plants associated with the option as well as the variety of food plants produced for consumption – i.e. dietary diversity.

## **Economic Criteria**

### **Capital cost and potential to recover initial investment (public/private)**

What is the cost of pursuing the option (to a private developer, to a commercial grower or to the City)?

### **Long term maintenance cost - for public/private sector**

What is the on-going maintenance cost for the City, for developers or for commercial growers?

### **Impact on adjacent land value**

What is the impact of the option on adjacent land value?

### **Create jobs and economic development**

To what extent does the option create jobs and/or local economic development?

## **Other Criteria**

### **Ease of implementation**

How simple is the option to implement?

### **Ability to transfer the technique to another community**

Can the technique be transferred easily to other communities or is the option uniquely suited to SEFC?

### **Ability to change to another land use if found to be unsuccessful**

If the option does not work, how easy will it be to transform the space to another use?

### **Achievement of multiple objectives (multiple functionality)**

To what extent does the option achieve multiple benefits simultaneously as opposed to targeting a single objective?

### **New and Innovative**

What is the educational value of the option for SEFC as a model sustainable community – does the option allow exploration of the limits of understanding about sustainability and contribute towards the overall knowledge of sustainable communities?

Table 14-1: Evaluation of Food Production Options

	OptionG1 Community Gardens	OptionG2 Backyard Gardens	OptionG3 Rooftop Gardens	OptionG4 Babories& WindowBoxes	OptionG5 Edible Landscaping	OptionG6 Commercial Greenhouses	OptionG7 Commercial MarketGardens	OptionG8 InsideBuildings	OptionG9 School Gardens	OptionG10 Aquaculture& Edgronics	OptionG11 MicroLivestock
<b>Social</b>											
Level Of Food Self-Sufficiency (I.e. How Much Of The Resident's Food Needs Are Met) - Quantity And Quality Of Food Produced	2	1	3	1	1	5	4	2	2	4	2
Social And Recreational Impacts On The Community	5	4	4	1	2	1	1	-1	4	1	-3
Impact on individual Health, Diet and Safety	3	3	2	1	2	4	4	1	2	3	1
Educational – Understanding The Relationship Between The Land And Food	4	4	3	1	3	3	3	1	5	4	3
Impact On Other Land Uses/Users	0	0	2	1	3	-1	-1	-1	2	-1	-4
Opportunities For All Residents To Participate	3	2	4	4	3	-2	-2	-1	2	1	1
<b>Environmental</b>											
Stormwater Management	1	0	4	1	0	-3	1	0	0	2	-2
Use/Recycling of Wastes - Solid, Liquid, Heat	3	2	3	1	2	4	3	3	2	5	4
Energy Conservation	1	1	3	1	1	3	2	1	1	2	1
Impact on Local Travel	1	1	3	1	1	4	3	1	1	2	1
Water Conservation	-1	-1	-1	-1	-2	-3	-3	-1	-3	-1	-3

	OptionG1 Community Gardens	OptionG2 Backyard Gardens	OptionG3 Rooftop Gardens	OptionG4 Balconies & Window Boxes	OptionG5 Edible Landscaping	OptionG6 Commercial Greenhouses	OptionG7 Commercial Market Gardens	OptionG8 Inside Buildings	OptionG9 School Gardens	OptionG10 Aquaculture & Bioponics	OptionG11 Micro-Livestock
Creation Of Oxygen	1	1	2	1	2	2	2	0	2	0	0
Affect On Air Quality	1	1	1	0	1	-1	-1	-2	1	-1	-3
Biodiversity	3	1	2	1	3	1	2	0	2	1	1
<b>Economic</b>											
Capital Cost & Potential To Recover Initial Investment (Public/Private)	-2	0	-2	1	1	2	3	0	-1	2	0
Long Term Maintenance Cost - For Public/Private Sector	1	5	-3	-1	-2	-3	0	-2	-2	-3	-2
Impact On Adjacent Land Value	2	0	3	1	1	-2	-1	-2	2	-1	-3
Create Jobs And Economic Development	0	0	1	0	1	3	2	1	0	3	1
<b>Other</b>											
Ease Of Implementation	1	4	-3	0	-2	-4	-2	-3	-1	-3	-5
Transferability	4	5	3	5	3	-2	-2	-2	2	0	-2
Ability To Change To Another Land Use	5	5	3	N/a	5	3	3	N/a	N/a	2	N/a
Multi-Functionality	3	3	4	0	2	3	2	3	4	5	2
New and Innovative	2	0	3	0	2	3	2	4	3	5	4

Table 14-2: Evaluation of Processing and Distribution Options

	Option P1 Commercial Processing	Option P2 Food Incubator	Option P3 Eco- Industrial Complex	Option D1 Farmers Market	Option D2 Direct Home Delivery	Option D3 Food Buying Clubs	Option D4 Grocery Store	Option D5 Emergency Food Services
<b>Social</b>								
Level Of Food Self-Sufficiency (i.e. How Much Of The Resident's Food Needs Are Met) - Quantity And Quality Of Food Produced	4	1	3	3	2	2	3	2
Social And Recreational Impacts On The Community	1	3	3	4	0	4	1	4
Impact on individual Health, Diet and Safety	2	3	2	3	3	2	1	4
Educational – Understanding The Relationship Between The Land And Food	2	5	5	3	3	2	0	0
Impact On Other Land Uses/Users	-1	0	-1	-1	0	0	1	-3
Opportunities For All Residents To Participate	1	3	2	5	5	5	5	1
<b>Environmental</b>								
Stormwater Management	0	0	4	-1	0	0	-2	0
Use Of Wastes - Solid, Liquid, Heat	1	0	5	0	0	0	0	0
Energy Conservation	-1	0	5	1	0	0	0	0

	Option P1 Commercial Processing	Option P2 Food Incubator	Option P3 Eco- Industrial Complex	Option D1 Farmers Market	Option D2 Direct Home Delivery	Option D3 Food Buying Clubs	Option D4 Grocery Store	Option D5 Emergency Food Services
Reduces Local Travel	1	0	0	3	5	3	5	1
Water Conservation	-2	0	5	0	0	0	-2	0
Creation Of Oxygen	0	0	1	0	0	0	0	0
Affect On Air Quality	-1	0	3	0	0	0	-1	0
Biodiversity	0	0	1	2	0	0	0	0
<b>Economic</b>								
Capital Cost & Potential To Recover Initial Investment (Public/Private)	2	-1	-2	5	5	4	2	-3
Long Term Maintenance Cost - For Public/Private Sector	2	-2	-1	4	5	5	1	-4
Impact On Adjacent Land Value	-1	1	1	1	0	0	-1	-3
Create Jobs And Economic Development	3	3	2	2	2	0	3	1
<b>Other</b>								
Ease Of Implementation	2	-2	-4	3	4	3	1	-2
Transferability	5	1	1	3	5	5	4	2
Ability To Change To Another Land Use	-1	-2	-2	5	5	3	-3	-1
Multi-Functionality	2	3	5	3	2	1	0	0
New and Innovative	3	4	5	2	3	2	-1	1





## 14.1 Evaluation for Suitability of Options for SEFC

Table 14-3 summarizes (and provides some brief comments on) the suitability of each option for various types of space at SEFC. Each option is given a simple measure of suitability - high, medium, or low suitability. N/a (not applicable) means that the option is not suitable for that type of space.

Again, as with the evaluation matrices, this is a highly subjective assessment and reflects the opinions of the authors and the feedback gained from stakeholder workshops. Further detailed assessments will be required to ascertain whether or not any option is feasible in any given situation.

Table 14-3: Suitability of Options for Different Types of Space.

SPACES OPTIONS	Residential Buildings (and associated landscape)	Commercial / Industrial Buildings (and associated landscape)*	Public Buildings (and associated landscape)	School (and associated landscape)	Waterfront Public Park	ROWS for Streets/ other infrastructure	Land Dedicated/ Zoned for Urban Ag*	Floating Barges on False Creek*
<b>G1 Public Community Gardens</b>	N/a	N/a	Low/Medium The landscape around a public building could be used for community gardens but will likely be too restricted. However, rooftop might be designed for public access and community garden.	High For students and families only or wider community	Medium Public park is well suited but competing uses may restrict opportunity.	Low/Medium Some streets may be quiet enough and of suitable design to accommodate community gardens.	Low Should include community gardens only if other suitable land not available.	Medium Community gardens could be designed and built in large- scale planters situated on floating barges.
<b>G2 Private, Semi- private Backyards</b>	Medium Very few private, at grade gardens at SEFC but strata landscapes are suitable if appropriate management arrangements can be achieved.	N/a	N/a	N/a	N/a	N/a	N/a	N/a
<b>G3 Rooftop Gardens/ Greenhouses</b>	High There are numerous opportunities for rooftop gardens on most residential buildings. Podiums on concrete buildings present the fewest challenges.	High Commercial/ industrial buildings may be able to generate additional sources of income by incorporating high value crops on rooftop space. Space could be leased to an urban agriculture entrepreneur or NGO.	High May be used for a commercial rooftop urban agriculture demonstration project or for a public rooftop garden.	Medium School building could be designed for student access but safety considerations paramount. Require co-operation of school board.	N/a	N/a	N/a	N/a

SPACES		Residential Buildings (and associated landscape)	Commercial / Industrial Buildings (and associated landscape)*	Public Buildings (and associated landscape)	School (and associated landscape)	Waterfront Public Park	ROWS for Streets/ other infrastructure	Land Dedicated/ Zoned for Urban Ag*	Floating Barges on False Creek*
<b>OPTIONS</b>									
<b>G4</b>	Balconies	High There will be numerous balconies in residential buildings.	Low Most commercial/ industrial buildings will not have balconies and employees less likely in general to pursue this type of activity.	Low Few balconies and too infrequent attention unless specifically programmed for this purpose.	Medium Balconies might be included in school building and represent a convenient opportunity for students/teachers.	N/a	N/a	N/a	N/a
<b>G5</b>	Edible Landscaping	Medium The semi-private open space and more public landscaping that fronts onto the street is appropriate for edible landscaping. This will retain a high level of aesthetic quality while producing a small amount of food.	Low Landscapes of industrial/commercial buildings are generally less well maintained and usually need to be more functional. However, depending on the type of business this option might be appropriate.	Medium Public buildings represents a good opportunity for a demonstration project to show case the potential of edible landscaping.	High Many edible plants can be incorporated into the school landscape and provide educational, aesthetic and habitat benefits.	High The public park present significant opportunities to experiment with food bearing ornamental varieties of bush, tree and flower.  Combined with educational program.	Medium Some streets will be appropriate for planting fruit bearing trees and bushes. There are however, some liability, safety and nuisance considerations.	Low Should focus on very high food output techniques rather than aesthetics.	Low As part of G1
<b>G6</b>	Commercial Greenhouses at Grade	N/a	N/a	N/a	Medium An educational, training opportunity and could produce large amount of food for school snacks and meal programs.	Low Requires significant shift in Parks Board Policy. However, would provide an interesting commercial enterprise and public benefit. Might be linked with restaurant in Park.	N/a	High Ideally suited. If included, commercial greenhouses on dedicated land could produce a large quantity of the community's food needs. However, opportunity cost of other land uses.	Medium An ideal use on a floating barge. Increased security and a self-contained system required.

SPACES	Residential Buildings (and associated landscape)	Commercial / Industrial Buildings (and associated landscape)*	Public Buildings (and associated landscape)	School (and associated landscape)	Waterfront Public Park	ROWs for Streets/ other infrastructure	Land Dedicated/ Zoned for Urban Ag*	Floating Barges on False Creek*
<b>OPTIONS</b>								
<b>G7 Commercial Market Gardens at Grade</b>	N/a	Low Perhaps temporarily if land is vacant but soil contamination issue must be resolved.	N/a	Low An educational, training opportunity. Could produce reasonable amount of food for school snacks and meal programs.	N/a Requires too much land in over programmed park.	N/a Space too small and fragmented for any commercial production.	Medium Well suited but greenhouses may be higher yielding and therefore more appropriate	Low Probably too small a space for any but the most intensive crop systems.
<b>G8 Mushrooms and Sprouts Inside Buildings</b>	Low Possible in unused parking stall, but potential challenges of odour insects etc.	Low Possible but value generated probably not high enough to support location unless encouraged by City.	Low Possible as a small demonstration project in combination with other options.	Low As an educational project in the basement or combined with option G5 or G6.	N/a	N/a	Low Should be reserved for urban agriculture that has a more public face.	Low Possible in enclosed space.
<b>G9 School Gardens</b>	N/a	N/a	N/a	High Gardens dedicated for the educational benefit of children and/or to supplement families' nutritional needs. Linked with education/training on healthy food preparation and diet	Medium Plots for school children could be incorporated into the park space.	Low Gardens for school could be located in ROWs but would require too much supervision and vigilance from supervisors except in very quiet, low traffic situations.	Low School could lease parts of this land from City and produce food for school meals for example.	Low School could lease part of floating barge to use for an educational program. However, safety issue.
<b>G10 Aquaculture &amp; Bioponics</b>	Low It is not appropriate for residents to raise fish in a multi-tenant building but building owners could possibly lease out part of the building to commercial operator.	Medium Building owner could lease commercial aquaculture operator space for this option.  Need to consider conflict of uses and tight regulations.	Medium/High Aquaculture could make a fascinating demonstration /educational project and show how a vital protein component can be raised in an environmentally friendly manner.	Low/Medium Probably too technically demanding unless with assistance from commercial operator or technical college.	N/a	N/a	Medium/High An appropriate use for land dedicated to agriculture.	Medium

SPACES		Residential Buildings (and associated landscape)	Commercial / Industrial Buildings (and associated landscape)*	Public Buildings (and associated landscape)	School (and associated landscape)	Waterfront Public Park	ROWS for Streets/ other infrastructure	Land Dedicated/ Zoned for Urban Ag*	Floating Barges on False Creek*
<b>OPTIONS</b>									
<b>G11</b>	Micro-livestock	Medium Could raise bees in rooftop hives.	Medium Could raise bees in rooftop hives.	High Could raise bees in rooftop hives. Interesting demonstration project.	High Could raise bees in rooftop hives or at grade. Interesting educational project and pollination.	Medium/High Combined with option G1.	N/a.	Medium/High Appropriate if combined with G5, G6.	Low Beehives could be located on barge in combination with other option G5, G6.
<b>P1</b>	Commercial Food Processing Facility	Medium Provided that ground floor commercial space was allowed in the zoning, it would be feasible to have a commercial kitchen on the ground floor	High A commercial kitchen would be an ideal tenant for a ground floor unit in a commercial building.	Medium If a community food centre was created with multiple food org.s in a public bldg, it could make sense to house the commercial kitchen within the centre.	N/a	N/a	N/a	High	N/a
<b>P2</b>	Food incubator	Medium A food incubator could be housed in a commercial food processing facility and thereby use the same space	High Provided that public access wasn't restricted, a food incubator would be suitable for this space	Medium As with the above, a food incubator would be a logical component of a community food centre	Low It may be that the school could incorporate food processing as part of educational strategy	N/a	N/a	High	N/a
<b>P3</b>	Eco-industrial complex for food processing	Low Very few industrial ecology components would be appropriate for a residential space.	Medium/High By thoughtfully co-locating commercial tenants a wide range of industrial ecology components could be implemented.	Medium Some publicly funded industrial ecology demonstration projects would be suitable for this space.	N/a	N/a	N/a	High	N/a
<b>D1</b>	Farmers Market	N/a	Medium A commercial space would be technically suitable so long as the rents could be subsidized.	High A public parking area or public building are the most suitable sites for a farmers market.	Medium A school is suitable location for a farmers market so long as there is adequate hard surface area.	High If the park includes a public plaza with hard surfacing that can accommodate small trucks	N/a	High	N/a

<b>SPACES</b>	<b>Residential Buildings (and associated landscape)</b>	<b>Commercial / Industrial Buildings (and associated landscape)*</b>	<b>Public Buildings (and associated landscape)</b>	<b>School (and associated landscape)</b>	<b>Waterfront Public Park</b>	<b>ROWs for Streets/ other infrastructure</b>	<b>Land Dedicated/ Zoned for Urban Ag*</b>	<b>Floating Barges on False Creek*</b>
<b>OPTIONS</b>								
<b>D2 Direct Home Delivery</b>	N/a	Medium If direct home delivery firm could rent commercial space although the rents will likely be too high in SEFC.	N/a	N/a	N/a	N/a	N/a	N/a
<b>D3 Food Buying Clubs</b>	Low It is technically possible to operate a food buying club in a residential suite or common area space but not desirable.	Medium The most suitable space to house a food-buying club would be the food incubator, as it is set up for food handling.	Medium A public meeting room or hall would be suitable for dividing up case lot s of dry goods and produce items.	N/a	N/a	N/a	N/a	N/a
<b>D4 Grocery Store</b>	High A ground floor commercial space would be very suitable for a small grocery store.	High A ground floor commercial space would be very suitable for a grocery store.	High A ground floor space would be very suitable for a Granville Island style public market.	N/a	N/a	N/a	N/a	N/a
<b>D5 Emergency Food Services</b>	Low Probably little appetite amongst residents for this type of activity.	Low/Medium It would be appropriate to house a collection depot within a food-related commercial space.	Medium If a food market were housed in a public building, it would be suitable to have a collection depot. Could also house emergency meal program/café.	Medium The school could act as a centre for food collection.	N/a	N/a	N/a	N/a

\* Spaces/Land Uses marked with an asterisk are not currently planned for SEFC but could, in theory, be included at SEFC if the City elected to do so. We include them here, recognizing the slim possibility of their inclusion, for the purpose of underscoring that some options are only possible with certain types of dedicated land use and in the hope that their inclusion at this time might stimulate debate when future areas of the City are planned.

N/a - means option is not suitable for the type of space.