abstract

Urbanization is eating our foodshed. While policy-level attempts to address agricultural land conversion focus primarily on the preservation of agricultural land and urban containment, few solutions have been explored for the edge - where the two meet. Developed at the regional scale of land-use planning, present-day strategies are generally characterized as prescriptions for land-use conflict mitigation and the resultant places - or placelessness - is largely defined by the segregation and/or buffering of residential development from agricultural land. This project examines the alternative strategy of integration at the urban-agricultural edge, based on the articulation of agrarian values and the ideas presented by 'new-ruralism.' The application of these principles to the Southlands property in Tsawwassen, British Columbia, serves as a test case to explore strategies for the re-integration of the urban-agricultural edge, the development of agriculturally-integrated neighborhoods and the use of development as a mechanism for the transformation of our local food system. Beyond the scale of the Southlands, this project attempts to re-examine our relationship to agricultural landscapes and proposes the deliberately designed edge as a means to re-integrate city and country, stop urban sprawl, and engender stewardship of the natural systems that sustain us.
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Thanks to my friends for keeping me sane: for helping me stay focused when feeling distracted... and for distracting me when feeling too focused.

Finally, thanks to home, to my family and the village that raised me, for teaching me the value of land, food and community: without your infinite encouragement none of this was remotely possible.
For the farmers—past, present and future—who have built and sustained great civilizations:

May our myopic attitude towards the land and its stewards be laid fallow.
1.1: introduction

Growing up in Columbia, Tennessee, I have been surrounded by characters. Some might say these men and women are larger than life. To me, like goldfish, they have grown to fit the size of their surroundings and the limitless agricultural landscapes have provided a plenty. More to the point, the people and places exist as one and the same—like vital organs of a singular body, there is no separating family from farm, farm from family.

From these people and places, a culture of great storytelling has evolved. Just as were the indigenous oral traditions of the past, these stories are based largely on the phenomenology of place as well as an admitted exaggeration of the awe and wonder of our everyday experiences. People from places make stories. And so stories from places make people. In the end, we owe much to the places from which we come.
The manifestations of our current dilemmas in land use planning - from sprawling development to habitat loss - can be categorically defined as exercises in placelessness. In the words of singer/songwriter James McMurtry: "[It] looked like so many towns I might have been through... on my way to somewhere else" (1989).

In a world transformed by increasing industrialization and standardization, made possible by the light-speed exchange of information and ideas in the "global" marketplace, more and more individuals - and communities alike - are starting to wonder: At what cost? How much are we willing to trade for our uniqueness, our identity? Few other places have been so severely affected by this transformation as the urban-rural edge. While suburbia grows into a new incarnation as "edge city" (Garreau, 1991), surrounding landscapes are consumed by those continuing the search for the triple-dream of home, nature and community (Hayden, 2003). It is here that all of the lessons that we should have learned are forgotten and the cycle continues: "residents' hope of unspoiled nature fails because open land vanishes with increased development" (Hayden, 2003). McMurtry laments, "[You] shoulda been here... back about ten years... before it got ruined by folks like me" (1989).

More and more, that which is 'local' is valued not through the wistful lens of nostalgia, but through the critical regionalist perspective of placemaking and sustainable development principles of 'complete communities.'
Landscape architecture has a critical role to play in reconciling the separation of nature and culture. I believe that the forms and functions of natural systems hold the clues to the uniqueness and authenticity of all landscapes, whether urban or rural. It is only through the recognition of these dynamics and all they reveal that place can be created.

More specifically, in addressing the current dysfunctions of the urban-agricultural edge, it is my hope that we can mediate between these two land uses and create vibrant places, where the design of "complete communities" articulates the values found in Leopold's land ethic:

"All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to co-operate... The land ethic simply enlarges the boundaries of the community to include soils, waters, plants and animals, or collectively: the land" (Leopold, 1949).
"To answer these questions is to enter practically into a complex, moral dimension that takes seriously the places we are in and the character of our dwelling within these places. They demand the sort of democratic and public conversation that has all but disappeared in our time. None of these questions can be adequately or truthfully answered without patient, detailed attention to place, or without sustained commitment to place and community."

Norman Wirzba, "Placing the Soul: An Agrarian Philosophical Principle"

1.2: project overview & objectives

Urbanization is eating our foodshed. Presently, British Columbia loses an estimated 300 hectares of farmland per year to urban land use (SmartGrowthBC, 2006).

While present-day ‘smart-growth’ policies attempt to control urban growth and preserve farmland, treatment of the urban-agricultural edge has been largely defined by efforts to mitigate conflict. Beyond the establishment of buffers designed with the singular intent of separation, this strategy has failed in its consideration of the larger scale implications to economic health, social well-being and environmental stewardship.

Is ‘out of sight, out of mind’ any place for agriculture? Or is it not a symptom of our increasingly dysfunctional relationship with an ever-more industrialized food system? A quick survey of the urban-
agricultural edge reveals the underlying attitudes and value system upon which the land-use, design and development decisions have been based:

- **Suburban development** stands with its back to the farm, stopped in a seemingly arbitrary manner - backyard, wooden fence, drainage ditch and potato field - suggesting a most temporary rest in its march across the landscape.

- **Adjacent agricultural lands** offer little in response. Its lost uniqueness of place, subverted by economies of scale, standardization and control, speaks to the "McDonaldization" of agriculture through the emerging core values of efficiency, calculability, predictability and increased control through the replacement of human by non-human technology (Ritzer, 1994). Many farmers, trapped in the Sisyphean industrial agribusiness model, are forced to 'buy-in or get out' and can take a self-righteous attitude towards their right to farm by any means necessary.

Entrenched in their respective camps, the suburbanite and the farmer stand at an impasse. Though admittedly an oversimplification of the issue, it has resulted in the oversimplification of the current urban-rural edge in planning policy. These landscapes are characterized by a glaring lack of detailed attention to design and a resultant sense of placelessness at the boundary of yard and farm.

The solutions, however, are far more nuanced than popular rhetoric.
- pitching developer against preservationist - would have us believe. The issues are complex and so too shall be the appropriate solutions. Real challenges exist and should be considered catalysts for creative problem solving. To resign ourselves to this dysfunctional relationship with the natural systems that provide for our very existence is to turn our back to the endless opportunities presented by these very same dynamic edge conditions.

Our first task is to be explicit in our design intent for the urban-agricultural edge. It is our role as landscape architects to help articulate a design of the urban-rural edge that mediates between culture and nature. Many efforts have been made in the planning realm to deal with the issue from 30,000 feet, high above where people and places form our everyday experiences and shape our values.

Landscape ecologist Kathryn Freemark argues that:

"Our challenge is to create the socio-cultural commitment and spatially integrated decision-making process in which the rural character of farmlands can be sustained and farmers, other land owners, citizens, the development community, planners, and elected officials act as managers and stewards of the countryside, rather than just as consumers or producers for the market" (2005).

I believe we can take this one step further in considering the spatial integration of the actual landscapes themselves.

It is my belief that deliberate design of a more robust urban-rural edge, based on a 21st century interpretation of agrarian values, can
reintegrate city and country, stop urban sprawl, and protect the natural systems that sustain us. We can move beyond the point of mitigation and create a realm of tremendous opportunity.

Through the critique of models of conventional development and industrial agribusiness and the policy-based planning efforts to resolve their incompatibility and conflict, this project proposes alternative treatments of the urban-agricultural edge. The specific objectives of this graduation project are to:

- Critique present-day policy and resultant conditions of the urban-agricultural edge.
- Investigate concepts and approaches to land-use planning and design from the perspectives of agricultural values, conservation values and landscape design.
- Develop a deliberate design approach to the urban-agricultural edge problem, based upon an articulation of a 21st century agrarian values.
- Explore edge development (using a Lower-Mainland agricultural site as a case study) as a positive force for community building, restoration and placemaking along the agricultural edge.

(Refer to appendix 1 for project process diagram.)
"Not only are we losing farmland, we are losing farmers."

local BC farmer

"To keep every cog and wheel is the first rule of intelligent tinkering."

Aldo Leopold, A Sand County Almanac

1.3: a recent history of agriculture

As a child, I recall sitting in front of the TV, fascinated as I watched cartoon character George Jetson input a meal order into a refrigerator-sized, computer-like machine (with all of the requisite dials and buttons of a 1970's interpretation of future technology). In an instant, a small door opened and a heaping plate of food emerged, steaming hot and ready to eat.

Today, we are not so far away... Sitting in a coffee shop with wireless internet, I can work on my computer and have my groceries delivered to my home. From locally-grown organic produce to pre-prepared, ready-to-eat meals, the selection is seemingly limitless. Frozen goods come packed with dry ice. Warm meals arrive in re-usable insulated packaging.
Though truly amazing from the point-of-view of communications technology and convenience, this is the perfect glimpse into the decades-long transformation of our food system.

In just over fifty years, we have been transformed from a culture built of farmers to a culture built of consumers (Kimbrell, 2002). Our hands have been washed of the soil and our rural landscapes are increasingly depopulated. Wendell Berry offers evidence:

“In October of 1993, the New York Times announced that the United States Census Bureau would “no longer count the number of Americans who live on farms.” In explaining the decision, the Times provided some figures as troubling as they were unsurprising. Between 1910 and 1920, we had 32 million farmers living on farms -- about a third of our population. By 1950, this population had declined, but our farm population was still 23 million. By 1991, the number was only 4.6 million, less than 2 percent of the national population. That is, our farm population had declined by an average of almost half a million people a year for forty-one years” (Berry in Mander, 1998).

The trend continues as small farms are forced to ‘get big or get out.’ Consolidation is a first step in industrialization and local numbers suggest a similar trajectory: in the five year period between 1996 and 2001, an increase in total farmland reported by a fewer total number of farms shows the average size of farm in British Columbia was larger - an average increase from 116 hectares to 128 hectares (BCMAL, 2001).

The economic implications for the remaining handful of small farmers are bleak. At a recent panel discussion on the future of farming in BC, a local farmer told the following two versions of a joke, claiming the latter more appropriate to today’s realities as a small farmer:

Version 1: “A reporter asked a farmer what she planned on doing upon winning the lottery, to which she replied, ‘pay my bills.’ The reporter proceeded, ‘...and what will you do with the rest?’ to which the farmer replied, ‘keep farming until I run out.’”
Version 2: “A reporter asked a farmer what she planned on doing upon winning the lottery, to which she replied, ‘pay my bills.’ The reporter proceeded, ‘...and what will you do with the rest?’ to which the farmer replied, ‘well... the rest of the bills will just have to wait.’”

But beyond the tough economic situation of small farmers, the system seems to be working just fine. A trip to the local supermarket is enough to tell you that there’s plenty to eat, the variety is staggering and what’s more, it’s cheap.

On a recent visit, I counted more than ten types of cooking oil, twenty fresh fruits and fifty vegetables, sixty types of meat and seafood, thirty dairy products (including yogurt, milk, butter and cheeses), and countless grains and cereals. A bottle of olives from Spain - picked, processed, packaged and shipped - costs less than ten dollars. A cup of coffee from South America costs less than two. The macroeconomic indicators point to success as well - over the last several decades, modern agriculture has created a remarkable overabundance. Worldwide, over the past 35 years, per capita food production has grown 16% faster than population (Kimbrell, 2002).

Since the rise of modern man some 200,000 years ago, we have indeed come a long way from our hunter/gatherer past. So far, in fact, that the question of where our food comes from seems irrelevant to most individuals. And why wouldn’t it be? In the context of a world of food at your fingertips, it is difficult for some to see the underlying dysfunctions of the food system.
Industrialized farming practices have singularly removed farmers from the agricultural landscape. Beyond farm consolidation, the industrial model of food production has focused on maximizing efficiency with respect to human labor inputs, resulting in the replacement of human with non-human technology (Ritzer, 1994). Present-day business models have little room for the time-intensive management practices that have kept agriculture alive for millennia. Indeed, what is occurring throughout much of the world can be seen as an economically-biased valuation of land focused on the maximization of a singular target variable: profit. Christopher Alexander (1977) put it succinctly: “If we continue to treat the land as an instrument for our enjoyment, and as a source of economic profit... our farms will become more and more like factories.”

As real estate speculation overtakes the value of agricultural production, the market facilitates a seamless progression. The inevitable conclusion becomes conversion: the added value of farming on the landscape cannot compete with the market prices of residential, commercial and/or industrial development. Along the urban-agricultural edge, increasing land values often shift farmers’ profit motive from farm operations to capital gains from real estate sales (Burchell, et. al, 2003). Canada is no exception to the trend: By 2001, half of the nation’s urban landscape was located on dependable agricultural soils (Hoffman, et. al, 2005).

And so Adam Smith’s “invisible hand” is hard at work across our agricultural land. The industrialization of farming has depopulated the rural landscape and resulted in the fraying of the close-knit social fabric of farming communities. Drifting farther and farther from a
culture of land stewardship, many places already resemble a “post-agricultural” condition (Berry in Mander, 1998). Some see cause for concern:

“There are good reasons to suggest that a culture loses its indispensable moorings, and thus potentially distorts its overall aims, when it forgoes the sympathy and knowledge that grows out of cultivating (cultura) the land (ager)” (Wirzba, 2003).

Beyond the loss of farmers and farming technique, we are seeing the loss of the very biological foundations of agriculture. The industrial model facilitates long-distance transport of food, creating a nutrient imbalance of food waste on the consumer side, while producers are faced with nutrient loss and lack of organic material for proper soil management (Halweil, 2002). Concentrated chemical fertilizers are used as a substitute and replace most farmers’ understanding of basic soil management, not without dramatic consequences to soil biology. Rates of decomposition and nutrient availability are severely altered as a result of decreased soil health (Matson, et. al., 1997).

In response to Leopold’s first rule, to “keep every cog and wheel” (Leopold, 1949), the industrial model argues the efficiencies of a more simplified system and the values are articulated in the almost infinite crop rows stretching across our agricultural landscapes. Read a bit further into this picture and you can see there is little room for anything beyond what the business model recognizes. Something so complex as a ‘natural community,’ or even a ‘farm community,’ cannot hope to fit within its profit margins.
In conclusion, while we have enjoyed certain conveniences provided by the industrial food system, we have become so entirely separated from it as to know little of its condition. Physically, socially and psychologically distanced from our agricultural landscapes, we are increasingly unaware of their social and environmental disrepair.

Most troubling of all, few people interested in trying their hand at growing have the confidence to make a legitimate effort. In the recent debate over the integrity of British Columbia’s Agricultural Land Reserve (ALR), the real dilemma surfaces: we can save the land for farming but who will farm it?

Many urbanites, interested in the promise of local community, food security and sustainability are eager to find ways to make it work but are reluctant to become farmers themselves. Our cultural mythologies have obscured the image of farm life and more to the point, culturally-accepted indicators of success value physical exertion only in the context of recreation. People are educated from a very young age to avoid the real and perceived hardships of an agrarian lifestyle.

The separation of town and country becomes a self-referencing paradigm, reinforcing this dysfunctional relationship through the strengthening of the boundaries and the segregation of experience, understanding and participation in our local food systems.
“Divided, body and soul, man and woman, producer and consumer, nature and technology, city and country are thrown into competition with one another. And none of these competitions is ever resolved in the triumph of one competitor, but only in the exhaustion of both.”

Wendel Berry, “The Unsettling of America: Culture & Agriculture”

1.4: local conflict & land-use planning policy

The present-day dysfunctions of the industrial food system, though largely unrecognized by the public, create considerable challenges along urbanized edges. Where suburban development abuts against the rural landscape, conflicts arise and current “edge-planning” policies have been developed largely in response to a growing need to address these conflicts. Many of the policies have largely focused on farm-side management alternatives (development permit areas and farm by-laws to minimize potential conflict) and farmers have been forced to add advocacy to their long list of daily chores. Ironically, the establishment of British Columbia’s ALR in 1973 defined the urban-agricultural edge as a means to protect farmland and effectively mapped the areas where this conflict would occur as urbanization continued. Little thought was given as to how to develop the edge with the intent of permanence.
ALR: Agricultural Land Reserve or Arbitrary Legal Restriction?

British Columbia’s Land Commission Act was passed on April 18, 1973, designating 4.7 million acres of agricultural land part of a land reserve to protect BC’s dwindling supply of agricultural land (ALC, 2006). Considering the rapid loss of farmland - and the community identity associated with these landscapes - due to urbanization across North America, such legislation is, if not progressive, certainly prudent. Few other places in North America are as fortunate as Vancouver to have protected their surrounding farmland. That said, from the dysfunctional relationship of the urban - rural edge to the ‘death-by-1000-cuts’ erosion of the Reserve itself, the ALR’s effectiveness is questionable in many respects.

The question is one of intent: is the ALR intended to protect agricultural land or contain urban growth? If the answer is the former, perhaps we should reconsider the types of farming practices that are practiced within the ALR. If it is the latter, perhaps we should evaluate changes to the boundary more strategically, based on regional growth.

Principally, the land-use planning approach of separation has time and time again proven ineffective at best. Considering the realities of industrialized farming, there is little wonder as to why exclusionary zoning is seen as appropriate, but to label it a “solution” is highly questionable. It comes as no surprise that we chose such a “safe place” for this type of agriculture - the segregation of dangerous, industrial land uses from our population centers was the very origin of...
zoning in North America (Hayden, 2003). Given a more contemporary understanding of landscape and human ecology, segregation hardly seems like a solution.

And while many advocates of ‘Smart Growth’ hail Vancouver’s ALR designation as progressive, leading proponents of ‘New Urbanism,’ Andres Duany and Elizabeth Plater-Zyberk, question such boundaries to growth, arguing, “There has never been a growth boundary that has held... And the reason is simple: Such boundaries are arbitrary... It is not organic” (Daniels, 1999). So while the ALR has served Vancouver well, it is arbitrary in a policy sense - as easily as policy is created, so too can it be dissolved.

More to the point, the ALR boundary was knowingly established based on imperfect information at coarse resolution. In a sense, the boundary was created as a place-holder, to be refined at some later date. While the creation of the ALR proved an effective tool to protect BC’s farmland, it is the ongoing “refinement” of its boundaries that worries most advocates of farmland protection. Built into the creation of the Reserve was the establishment of the Agricultural Land Commission (ALC) and a process through which lands can be included or excluded from the ALR. And while the ALC maintains that the ALR has effectively protected the quantity of BC farmland since its establishment in 1973, the quality of that farmland has declined (Smith, 2006).

In fact, the overall size of the ALR has actually increased by more than 43,000 hectares. However, between 1974 and 2000, only 5,446 hectares of prime agricultural land (measured class 1 to 3 as per the Land Capability Classification for Agriculture in British Columbia - refer to appendix 2) were included into the ALR. During the same period, 16,392 hectares of prime land were excluded from the Reserve. Generally speaking, for every one hectare of prime included into the ALR, three hectares of prime was excluded. (Sands, 2006) This trend is in large part due to the climate of southern BC which creates idyllic conditions for agriculture and settlement.
In addition to the protection of prime farmland, the ALR boundary has, in effect, served the region as an urban growth barrier. Unfortunately, the mandate of the ALC was never intended to weigh the merit of local development proposals. As a result, the greatest source of controversy in the political tug-of-war surrounding the ALR boundary is that of the exclusion process. While the Reserve boundary was established based on a wide range of biophysical measures intended to capture BC’s best agricultural land, the criteria used to determine a parcel’s merit for consideration in the exclusion process become much more convoluted. Agricultural viability is still considered, but today, less quantifiable arguments, based on growth and development needs and termed “provincial interest” or “community need” are playing an increasingly significant role in the exclusion of ALR lands.

Living on the edge: conflict and mitigation

While the ALR has effectively slowed the loss of agricultural land, it has also been largely responsible for designing the specific relationship of urban development next to the agricultural edge that allows for conflicts to arise. Examples of conflict include: trespassing, flood damage from stormwater, noise (from machinery, equipment & bird-scare devices), theft, damage and/or vandalism (to crops, livestock and/or equipment), odours (from waste & composting), dust (from exhaust fans & fields) and chemical drift (Ministry of Agriculture & Lands, 2005). In response, additional policies have been created in an attempt to mitigate the situation.

The BC Ministry of Agriculture & Lands (BCMAL) has taken steps to minimize potential conflict through the establishment of development permit areas and farm by-laws to ensure adjacent landowners are aware of their rights and responsibilities. In addition, the Ministry has worked with local farmers to realign certain farming operations to minimize noise and/or odours.

The use of development permit areas (DPA’s) attempts to prevent future conflict by controlling development adjacent to farm operations. The following examples are taken from the City of Surrey’s Of-
ficial Community Plan as part of their strategy to protect agriculture and agricultural land from neighboring development. Specifically, these strategies are intended to "promote compatibility between agricultural and non-agricultural land uses" (www.agf.gov.bc.ca).

- Buffering - Encourage the development of effective buffers along the boundary of agriculturally designated land.
- Adjacent Land Use - Encourage adjacent land uses to be compatible with existing farm use and ensure that the impacts (e.g. water runoff from upland areas) on agricultural lands will be minimized.
- Linear Development - Discourage, wherever possible, linear developments (i.e. hydro corridors, highways, pipelines, parks) through the Agricultural Land Reserve. When unavoidable, ensure that their impacts on the agricultural land are mitigated.
- Recreational Uses - Limit recreational uses on agricultural lands.

Yet conflicts still arise. An additional layer of policy, in the "Right to Farm" act, defends "normal farm practices" from unsubstantiated complaints. The policy contains a list of requirements by which normal practices are defined and further states:

"If each of the requirements... is fulfilled in relation to a farm operation conducted as part of a farm business:
(a) the farmer is not liable in nuisance to any person for any odour, noise, dust or other disturbance resulting from the farm operation, and
(b) the farmer must not be prevented by injunction or other order of a court from conducting that farm operation."
(Refer to appendix 3 for complete policy language.)

While intended to protect farmers, this policy only protects designated farming activities and results in the continuation of certain other
practices that only further create conflict and, in the end, compromise the farmer's advocacy. What of the potential to transform the urban-agricultural edge into an area where biologically benign farming practices commingle with our neighborhoods? Too often, within the realm of policy making, the suggestion of alternative farming practices sounds the alarm of additional regulation and constitutes near heresy within the BCMAL.

Another approach to mitigate conflict has been the establishment of buffers. A study of the effectiveness of vegetative buffers by the since renamed Ministry of Agriculture, Food & Fisheries found that “a visual barrier is important in minimizing complaints (out of sight out of mind)” (BCMAFF, 2001). This conclusion is particularly troubling. Could be inferred that ‘out of sight, out of mind’ is a safe place for agriculture? There is no doubt that this approach is extremely effective at reducing complaints, but a closer look at the collateral damage reveals urban populations completely disconnected from their food system. What hope is there for stewardship of our agricultural landscapes if the land is hidden from us? One only need look as far as the BC backcountry to see how well the forestry industry is managing BC’s “out of sight” forestlands. To sit idly while the urban and rural become more and more segregated is to sit and watch the very essence of human-nature dwindle away:

"It's not a choice between living in the country or the town; it is about understanding that every one of us, at the level of our cells and respiration, lives in the country and is thus obliged to be mindful of the distance between ourselves and our sustenance." (Kingsolver in Wirzba, 2003)
1.5: hope for our future

Within the growing discussion of sustainability, the household slogans of “reuse, reduce, recycle,” are being replaced by more sophisticated ideas of ecological footprints, embodied energy and carbon offsets. At the same time, these complex means to understanding our resource use have aided in the popular trend among many for simpler, healthier lifestyles. These preferences are reflected in consumer choice and recreational activities.

The rising popularity of urban agriculture - from a recreational standpoint or a deliberate investment in local food security - is a hopeful indicator of urban populations with severed ties to the land. Community garden plots regularly require long waitlists for the smallest of spaces. The blend of social interaction, food production and physical activity is more and more valued among urban populations.
At the same time, growth in the organic farming sector reflects market demand for organic foods: organic farming is the fastest-growing segment of BC’s agricultural community, having more than tripled since 1991 (Canadian Organic Growers Association, 2001).

That said, many young and not-so-young aspiring farmers are reluctant to attempt the challenge because of a lack of support. For newcomers, the skills required to make a farm operation profitable - and therefore sustainable - is not easily learned outside the farm.

Farm incubator projects (refer to The Intervale as precedent in section 3.1) offer a promising model for relocalizing food systems and building more local communities of growers. For younger farmers, the prospect of a panoply of urban amenity at the farm’s edge is exactly the model that can entice a new generation of growers. And the relationship of more densely populated urban centers at the farm’s edge offers greater market opportunities for local production.

Many of these ideas are articulated in the “Call for New Ruralism,” developed as a collaboration between UC Berkeley’s Institute of Urban and Regional Development (IURD) and Sustainable Agricultural Education (SAGE). New Ruralism translates the ideas of New Urbanism to the conditions of the rural edge and offers “the preservation and enhancement of urban edge areas as places that are indispensable to the economic, environmental and cultural vitality of cities and metropolitan regions” (SAGE, 2006). Further discussion of these principles is found in section 3.1 of this report.)
Finally, local or "slow" food movements are beginning to spread across the globe as populations reconsider the importance of regional food systems as part of regional identity and regional sustainability. With the rising cost of fuel, the idea of "burning lots of fossil fuel to ship cold water around" (Gussow in Halweil, 2002) makes long-distance transport of produce, flowers and frozen foods less economically feasible. As these costs start to counteract subsidies, smaller producers may well enjoy greater competitive advantage. Urban centers like Vancouver are realizing more and more that a local food system supports healthier farms, a healthier local economy and a healthier local population.
1.6: deliberate design &
the role of landscape architecture

While the increased discussion of all-things-sustainable offers promise, we are still a long way away from the transformation of our everyday experience along the agricultural-urban edge. Many edge treatments were developed with the sole intent of conflict mitigation and the vast majority of the 'design strategies' considered within present-day planning discussions are characterized as 'buffers.'

At the risk of sounding pedantic, it is critical that our language not limit the potential in seeking solutions: the term buffer refers to an object that prevents incompatible or antagonistic things from coming into contact and/or harming each other. Miriam-Webster (2006) defines a buffer as "any of various devices or pieces of material for reducing shock or damage due to contact." Do we really believe that agricultural and urban environments are "incompatible"? "Antagonistic"?
Beyond conflict mitigation, current edge-planning policies have resulted in a built fabric that segregates urban populations from the realities of food production. If the loss of agricultural lands is seen as a result of declining appreciation for these places, how can a policy of segregation and exclusion promote increased stewardship?

Here the question of intent is central. The purpose of present-day edge planning policy is to protect farming from people and people from farms. Something is terribly wrong with this picture. Our policy makers are deliberately designing policy to protect farming operations from complaints, vandalism and risk of litigation (from trespassers). At the same time, the policies intend to protect people from noise, chemical drift and odour. Careful consideration of this situation is indeed as much an indictment of industrialized farming practices as it is of the sentimental pastoralism behind much of today’s suburban development.

If we segregate our schoolyards from farms because we use poisonous chemicals to grow our food, perhaps we should reconsider how we grow our food. If we segregate our farmland from neighboring houses for fear of vandals, perhaps we should reconsider our value system and agriculture’s place within it.

**Beyond conflict mitigation**

Consider, for a moment, the alternative - medium density development clustered in and around working farmland and forestland - as a macro-hedgerow of economically, socially and environmentally productive integration of settlement and resource management. Communities settled around productive agricultural soils. Farming practices that are not only compatible with neighboring communities, but contribute to their overall heath.

In a simple exercise of better understanding the problem, we can quickly envision solutions, trans-
forming constraints into opportunities. The following is a list of urban-rural edge conflicts (as identified by the BCMAL) and respective opportunities presented by each:

trespassing - A more robust system of public and semi-public spaces along the edge (facilitated through covenants) allows for more recreational opportunity where recreational experience is directly linked to the adjacent working farms and gardens. Transitions between the public and private realm are clearly marked to provide neighbors and visitors alike clear visual indicators from semi-public to semi-private areas.

flood damage from stormwater - Restoration of “green infrastructure,” including riparian restoration & reforestation reduces occurrence of flooding during larger rainfall events and potential for greywater treatment and storage helps alleviate irrigation shortfalls during dry summer months.

noise (from machinery, equipment & bird-scare devices) - This source of conflict is immediately minimized by the scale/style of farming proposed. Small-scale organic farming practices, by nature, are much less mechanized and the added labor allows for alternative solutions, such as integrated bird management techniques.

theft, damage and/or vandalism (to crops, livestock and/or equipment) - Similar to the notion of “eyes on the street,” (Jacobs, 1961) a deliberately designed, integrated edge that fronts onto farmland, by nature, assumes a position of vigilance, watching over and protecting the farm. This type of community development discourages vandalism and intends to foster greater stewardship through the integration of productive landscapes, recreation and residential development.

odours (from waste & composting) - The main design challenge to confront here is one of scale: while the composting processes minimizes odours from agricultural waste and recycles nutrients back into the food system, large-scale waste management is odouriferous. A simple and straightforward solution involves decentralization of management to reduce scale (and transport requirements for spreading, etc.) and improved participation at the neighborhood scale of composting and nutrient recycling.

dust (from exhaust fans & fields) - Windbreaks and hedgerow treatments used to reduce aeolian erosion not only address issues of dust as a nuisance but provide high-value habitat for small mammals and migratory songbirds. In addition, these field margins provide excellent edges to recreational circulation and can contribute to additional agricultural/silvicultural capacity through timber and non-timber products.

chemical drift - The elimination of hazardous chemical drift through the implementation of certified organic farming practices contributes to the health of the total food system, from the microbial communities found in soils to what’s
served at the dinner table. Liability to farm workers and neighbors is eliminated and the chemical barrier to the public realm of agricultural open space is removed. Community farming - and the replacement of chemical pesticides and fertilizers with organic inputs, allows residents to engage in active stewardship of the land and personally contribute to the health of the system.

In summary, the edge should be so much more than its current manifestation, protecting people from farms and farms from people... Along the same lines as the UK’S Countryside Agency’s “Countryside for Towns” (2005) initiative, ideas include:

- bridge to the country connecting village to resource base
- gateway to the city announcing arrival to settlement
- regional health center providing recreational opportunities
- classroom providing educational opportunities
- recycling center through management of water and waste
- productive landscape feeding & housing our families
- cultural legacy containing clues to our history
- place for sustainable living examining new models for sustainable development
- engine for regeneration helping urban populations develop skills & healthy lifestyles

Section three of this report will elaborate on these and other program elements and section four will explore the physical articulation of these programs.

New directions for a designed edge

As designers of the public realm, landscape architects should take a much more proactive role in addressing this issue. It is our responsibility to confront the origins of any real or perceived conflict at the edge and explore design-based solutions to the problem. We can employ design as a tool to re-interpret and rearticulate the urban-rural interface in a way that capitalizes on the synergies of the
relationship, instead of simply resigning ourselves to the limits suggested by current policy.

In his response to Wendell Berry's *Unsettling of America*, some thirty years later, Brian Donahue pinpoints the crux of the issue in *The Resettling of America* (2003):

"Can we envision agrarian communities where the inhabitants work the land to widely varying degrees (some more, most less), but where all feel vitally connected to the land and its care by complex ties of use and ownership?"

He suggests, “the task before us is to transform suburban sprawl into agrarian village settlement” (Donahue in Wirzba, 2003).

In *Building Suburbia*, Hayden (2005) illustrates the way in which the development patterns of the various eras identified have been linked to the values and beliefs of the times. More to the point, she highlights that their growth & development have always been actively marketed to a public interested in an alternative model. There is a need to articulate such a model, not in the form of policy and regulation and incentive, but in actual built form as a means to demonstrate an alternative.

We cannot design people to be farmers. We can, however, use design as a tool to provide opportunities for interaction between Man and the land. By carefully considering the physical elements of the urban-agricultural interface, we can make deliberate interventions to integrate the urban-agricultural edge. It is in this reunion that greater
understanding and appreciation of agricultural landscapes can be achieved. The next section applies many of these ideas within specific site conditions and explores alternatives for the urban-agricultural edge. To reiterate, the specific objectives of the remaining sections are to develop a deliberate design approach to the urban-agricultural edge problem, based upon an articulation of 21st century agrarian values and to explore edge development - using a lower-mainland agricultural site as a case study - as a positive force for community building, restoration and placemaking along the agricultural edge.
2.1: site history & regional development

While it is easy to critique current land-use policies for the continued conflict, and placelessness of the urban-agricultural edge, deliberate design interventions prove hard to find. This project will attempt to ground these many issues in a specific place, local to the greater Vancouver region. The Southlands property, located in Tsawwassen, BC is a unique example of the potential for the urban-agricultural edge for many of the same reasons already considered in this paper. More in depth site analysis will follow, but a brief introduction to the site prevents any potential to confuse the preceding critique of policy with the issues of the site itself.

Wedged between the agricultural lands north of highway 17, the US-border, the Straight of Georgia and Boundary Bay, Tsawwassen, BC lies thirty kilometers south of Vancouver. The name Tsawwassen is Coast Salish in origin and means “looking toward the sea.” Aptly named, Tsawwassen enjoys views to
open water to the east and west and its visual identity is as defined by the bluffs, beaches and water views as it is by the surrounding farmland and rural character (Corporation of Delta, 1991).

The Southlands project site is a 538-acre tract of land situated in the heart of Tsawwassen. Its history is long, varied and at times highly controversial. The following section attempts to summarize salient points and provide context for the design considerations to follow.

Pre-contact

While few specifics are known about the earliest settlers to the region, excavation of middens has revealed evidence of habitation dating back 4,000 years. A study of First Nations peoples in the mid-1800s listed early inhabitants as Coast Salish Halkomelem Language Group, the Stalo Regional Group and the Tsawwassen (sometimes referred to as “Chewasin”) Band.

Post-contact settlement in Delta

Post-contact growth and development of Tsawwassen began with the sighting of the Point Roberts peninsula by the Spanish in 1792. While the Spanish called it “Punta Zepeda,” it was later renamed Point Roberts by Captain Vancouver in honor of his friend, Captain Henry Roberts. The establishment of the U.S.-Canadian border at the 49th parallel ended the long-standing territorial dispute between the U.S. and the British and divided the peninsula into its current configuration. The southern tip of the peninsula was originally used as a U.S. military reserve.

Settlement of Tsawwassen began through a series of Crown grants in the 1870’s and was concentrated along the agricultural lowlands, also favoured for their proximity to water-based transport.
With the creation of the dyke system and regular ferry service between Richmond and Ladner at the turn of the 20th century, Beach Grove and Boundary Bay became resort destinations for residents of Delta and Vancouver.

Tsawwassen’s period of greatest growth occurred during the 60’s and 70’s following the completion of the George Massey tunnel in 1958. During this time, single-family housing was developed extensively along the well-drained, forested upland areas surrounding the Southlands site.

Growth in Tsawwassen has declined sharply over the last two decades due to decreased availability of land for single family housing as well as policy-level decisions to redirect growth in the region as part of a strategic planning effort for the greater Vancouver regional district.

**Present-day land use & development**

The vast majority of Tsawwassen is allocated to single-family detached housing. A scattering of institutional lands provide for local schools, parks and churches and the ALR boundary forms the northern extent of development.

Tsawwassen’s development pattern is characterized as very low-density, between approximately 4-8 dwelling units per acre. While this type of low-density, single-family, detached housing development is a defining feature of Tsawwassen’s suburban/agricultural character,
it represents a net tax burden for the municipality. According to the American Farmland Trust, while residential development requires an average of 25% more in services than is paid for by tax revenue, farms, forests and open space generate almost 50% in returns to local communities (www.americanfarmland.org). While an additional study is needed to determine the specific numbers for Tsawwassen, it can be assumed that the general trend holds true.

Commercial services and higher density residential areas are located along 56th Street, concentrated at the intersection at 12th Avenue.

**Spetifore, TDL and the Southlands**

The site chosen for this project also has an interesting story and represents one of the most contentious properties - in terms of land-use planning and development - in recent Canadian history.

Land grants were awarded from the British Crown in the late 19th century for the lands now known as the Southlands and were originally owned by the Guishon, Spetifore and Wilson families.

With the establishment of the ALR in 1972/73, all of the Tsawwassen’s agricultural lands were included within the Reserve boundary, except the portion of Spetifore farmland to the east of Boundary Bay road. During the mid-1970’s, the Greater Vancouver Regional District (GVRD) negotiated with Spetifore and the Corporation of Delta to exclude the remainder of the Spetifore property in exchange for a

![Fig. 26: Existing commercial services are concentrated at the intersection of 12th Avenue and 56th Street.](image)
deal on the same lands to the east of Boundary Bay road. After years of discussion, the Spetifore property, along with the adjacent Wilson and Guishon farms - a total acreage of just over 500 acres - were excluded by a Provincial Order-in-Council in 1981. Later that year, Spetifore acquired the Wilson farm.

The first proposal for redevelopment of the Spetifore property was defeated by the GVRD’s regional planning authority in the mid 1980’s.

In 1986, Delta adopted their first Official Community Plan and designated agricultural lands excluded from the ALR as “urban” within the land-use zoning plans.

A second attempt to develop the Southlands was proposed in 1989 when Spetifore sold the property to Tsawwassen Development Lands Ltd. (TDL). Some of the features of the proposal included 1,895 housing units (scaled back from the 3,300 originally proposed), 55% open space (including the addition of 220 acres to Boundary Bay Regional Park and golf course development) and several financial incentives, including a $1M contribution to upgrade 52nd Street, $1.7M in support for the acquisition of the Boundary Bay school site for a future cultural center and a $150,000 contribution to the park board’s ongoing beautification of the entrance to Tsawwassen.

The attempt to rezone the agricultural lands was met with overwhelming local opposition and the resultant public hearing was the longest in Canadian history - logging more than 60 speakers and a total of 300 hours - effectively served as a public filibuster to the
project. Concerns centered around impact of development on wildlife habitat, traffic congestion, loss of farmland, taxation and general quality of life. The TDL proposal was abandoned and the property was eventually acquired by its present-day owner, Century Group.

In 1995, the approximate 220 acres east of Boundary Bay Road were purchased by the Provincial Government on behalf of the GVRD as part of an expansion to the Boundary Bay Regional Park (for more information refer to the following section on “Edge Conditions - Boundary Bay Regional Park”).

Fig. 28: Overwhelming opposition to the TDL proposal (above) sounded the death knell for development of the Southlands property in 1989.
2.2: constraints & opportunities: site selection

While the property has been subject to many complaints of noise, dust and chemical drift (including aerial spraying), the scale of its present-day agricultural production has yet to tip public opinion to the point of desiring development over agriculture. On the contrary, local residents and elected leaders have consistently argued against development of the property. Furthermore, it stands to question whether or not local residents who fought to keep the property zoned as agriculture are, in fact, advocates of local farming or more concerned with conserving open-space and local viewsheds.

This is not the extreme case of highly industrialized agriculture adjacent to suburban settlement as critiqued to this point: the context is significantly more mundane and as a result, more immediately relevant. These are the challenges we face on a daily basis. This site demonstrates the impasse of the land-use planning articulation of the urban-rural edge. The site is a telling portrait of local values and
attitudes - surrounding everything from economic growth development to environmental preservation to community identity and health - and how they are expressed through definitions of what cannot be done. Our present day environment - the landscape of regulatory policy - leaves the bar set at “less bad” (McDonough, 2002).

Perhaps the most significant constraint - and as a result, the most promising opportunity - for the Southlands site is the political atmosphere in South Delta. While the land is not restricted as part of the ALR, rezoning from agriculture to urban land use has been rejected on numerous occasions - the local community and elected officials have clearly indicated that they value this agricultural landscape as a defining characteristic of Tsawwassen. To their credit, any development proposal for the Southlands site must address all of these concerns and will, as a result, likely require a greater degree of considerate design.

The opportunities abound: More than 650 acres of prime farmland, surrounded by an affluent community poses tremendous potential to create a strong local market and food system. Beyond the present-day de facto access to the site, careful consideration in the design phase can allocate a significant portion of the site to open space and passive recreation networks. In addition, a galvanized local farming community with improved access to land and markets can provide local stewardship and employment opportunities as well as local educational opportunities. And then there’s the food! One only need visit their local farmer’s market during the growing season to appreciate the abundance of fresh, healthy produce available during the growing season. With local processing facilities and value-added agricultural production, this ‘taste of place’ can be extended throughout the year.

Finally, South Delta is experiencing negative population growth. Between 1996 and 2001, Tsawwassen’s population shrank by 0.4% and the trend continues. Almost 16% of Tsawwassen’s population was aged 65 or above as of 2001 and the challenges that face the community are clearly reflective of such a demographic imbalance (United Way of the Lower Mainland, 2003). Projections forecast:
• decreasing school enrollment and school closures
• decreasing demand for local organized sports facilities
• decreasing local demand for single-family housing
• increasing demand for medical services for persons 65+
• a shift in local housing demand for persons 65+
• a shift in local recreation demand for persons 65+

The following sections provide more in-depth analysis of the region’s history, development, biophysical characteristics and existing edge conditions.
2.3: site dynamics: from the ground up

Compared to the steep slopes of Vancouver’s North Shore or the wind-blown west coast of Vancouver Island, the Southlands site, like most agricultural land throughout the world, is a relatively passive environment. It is this very characteristic that makes agricultural land so valuable for future development as little investment is required to improve drainage or to regrade dangerous slopes. The following section calls attention to natural site dynamics considered in the design proposal as well as human cultural systems such as schools and parks, recreational greenways and transit.
Prevailing winds, tides & storm surge

Prevailing winds on the Southlands property originate from the south-east and northeast during the summer and winter respectively. The mean wind speed for the area is 6.11 m/s (www.windatlas.ca). Design of windbreaks for field crops and irrigation storage must consider wind effect on soil erosion and rates of evaporation and evapotranspiration.

Another effect of the strong winds from the southeast is continued erosion, transport and deposition of sediment in Boundary Bay. Due to construction of the Deltaport and Tsawwassen ferry terminals, sediment supply from the Fraser River system has been effectively eliminated. That said, longshore currents continue to transport a significant amount of sediment northward from the unconsolidated Pleistocene deposits found along the Point Roberts bluffs. Estimates from aerial photographs of the spit at Beach Grove taken between 1953 and 1995 suggest average transport rates of approximately 500-1000 m$^3$/year resulting in an average spit propagation of 125 m per decade (Page, et. al., 1998).

Despite its relative minimal relevance to the inland location of the Southlands project area, this information is included in order to gain a better understanding of the shoreline dynamics and the potential for restoration of the adjacent salt marsh & coastal lagoon habitat types in the Boundary Bay Regional Park.
Habitat types - historical & current

Historical aerial photography demonstrates the significant changes to the Boundary Bay coastal marsh system and provides a good idea of what the restored drainage systems might look like, as shown in figure 31.

In addition, analysis from the historical surveys of the Fraser Valley, conducted by the Royal Engineers in 1858, contains valuable clues to the pre-settlement conditions of the Southlands site. Notes from the original maps indicate plant communities associated with grassland and prairie, shrub cover consisting of willow and rose, and alder bottoms containing the occasional cedar, hemlock and spruce (North, 1979).

A much more detailed review of site conditions, constraints and opportunities would be required for successful restoration to occur. That said, this project proposal recognizes the potential to recreate and restore significant portions of the site and adjacent parkland as a means to increase the diversity of habitat types.

These habitat types - from the water’s edge at Boundary Bay to the edge of 56th Street - include: mixed deciduous/coniferous forest, early successional deciduous forest, oldfield, terrestrial backshore, sand spit and drainage channels, remnant spit deposits, salt marsh and mud/sand flats (Page et. al., 1998).
Slopes, soil, and drainage systems

Situated to the east of the large upland area, the Southlands site receives the vast majority of surface drainage from the southern portion of Tsawwassen.

Drainage on the Southlands property was improved significantly for the purposes of field agriculture with the addition of a drainage tile system, as shown in figure 34. A series of pumps and ditches, in conjunction with an extensive system of drain tile, keep the water table lowered, and decreases limitations on productions due to saturation, acidity and salinity (Bomke et. al., 1980).

Deficits in rainfall during the summer months have been cited as a limitation on the site's agricultural potential. That said, stormwater and greywater from the developed upland areas of Tsawwassen present a valuable resource for the recreational and agricultural potential of a redeveloped Southlands site.

Aside from small portions of the property with soil classes of 4 and above, the majority of the Southlands site has been characterized as prime agricultural soil for field-based production.
Human cultural systems

Transit - Five bus routes currently service Tsawwassen, with only one bus providing regular service to Vancouver (#601). The Village of Boundary Bay is particularly isolated with infrequent service of a singular bus route (#605).

Additional development of the Southlands site has potential to link existing transit service whereby providing increased frequency of service to existing and new neighborhoods through an interconnected, multi-modal transit network.

Parks and recreation - In addition to the globally significant Boundary Bay Regional Park, Tsawwassen has a significant number of local parks designed for both passive and active recreational uses.

Greenways - While greenways service a large portion of Tsawwassen, the Southlands site stands between the upland neighborhoods and Boundary Bay. Though the land is privately owned, the current owner permits passive recreational access across the property. During wet winter months, however, a car trip is often preferred to the unimproved “trail system.”

The addition of greenway connectivity through the Southlands project area will increase opportunities for residents of Tsawwassen’s upland areas to have more direct access to Boundary Bay. In addition, the redeveloped Southlands community will increase connectivity between Boundary Bay Village and the Tsawwassen town centre.
Views - Although Tsawwassen's OCP identifies a number of view corridors to “protect and enhance,” the specific location of the views themselves create considerable difficulty in achieving this goal. Aside from the parallel pedestrian circulation along vehicular routes (i.e. sidewalks along road corridors), few of the views are accessible to the public.

Development of the Southlands site would certainly impact the private (and limited public) views from the upland areas of Tsawwassen, but improvements to the site itself could increase opportunities for internal views within the framework of a larger recreational network of parks, gardens and trails.

That said, it might be argued that the views - and the larger community's general aesthetic valuation of the Southlands site - have the most significant role in determining the future of the site. Any proposal should carefully weigh the preservation of identified corridors as well as the creation of new opportunities for visual access.

While this section has attempted to inventory site dynamics, as well as amenities, opportunities and constraints of the community of Tsawwassen, the following section focuses more on immediate adjacencies of the Southlands site.

Fig. 37: Many of the view corridors identified for protection include the Southlands project site but few allow for public enjoyment beyond the windshield...

Fig. 38: Even the public views of the Southlands site - here seen from the "lookout" atop Diefenbaker Park - are limited and of poor quality.
2.4: existing edge conditions

The site is bordered by three very distinct edge conditions: park boundary, international boundary and low-density, detached (single-family) housing. Boundary Bay Regional Park and the village of Boundary Bay lie to the northeast and east respectively. The site's southern boundary is formed entirely by the international boundary with Point Roberts (Whatcom County, Washington State, US). Elevation increases to the west, where the property is bordered by 56th street and single-family residential development.
Boundary Bay Regional Park

Boundary Bay Regional Park is considered globally significant habitat for migratory waterfowl and shorebirds along the Pacific Migratory flyway. Its shallow depth, deposits of fine sediments and relative isolation from the dynamics of the Fraser River system define the ecology of Boundary Bay. The longshore sediment system - driven by strong southeasterly winds - transports eroded deposits from the east-facing, unconsolidated Pleistocene cliffs of Point Roberts northward along the coast (Page et al., 1998).

The series of dykes along Boundary Bay - established in 1959 - helped protect local residents from floodwaters and storm surge, but also resulted in significant alteration of the Park’s hydrology and the loss of approximately 62 hectares of salt marsh habitat.

In 1995, 220 acres were added to the park, extending the western boundary to its present-day location along Boundary Bay Road. This portion of the park was created to offset the loss of raptor habitat as a result of the Vancouver International Airport runway expansion.

Today the park offers recreational opportunities including 22 km of hiking & walking trails, 16 km of equestrian trails, 18 km of cycling trails, picnic areas, tennis courts, a softball field and beach facilities.
Boundary Bay Village

Established as a beach-resort destination in the early 20th century, the village of Boundary Bay is an interesting beachfront community wedged between the Southland property and Boundary Bay. Narrow streets, pedestrian laneways and a diversity of housing types create a very unique neighborhood and these characteristics provide a strong precedent from which to develop adjacent neighborhood designs.

Unfortunately, the small population of Boundary Bay and its relative isolation from Tsawwassen have made it difficult for even small commercial services - such as a local store and coffee shop - to survive for long.

56th Street, The Terrace & Forest by the Bay

The western edge of the Southlands site is bordered by 56th Avenue and the residential neighborhoods of The Terrace (to the south) and Forest by the Bay (to the north). While the traffic along 56th poses a challenge to connectivity, the adjacent neighborhoods make no attempt to engage the landscape in their built form. The predominantly detached, single-family houses back onto the farmland and fences and hedges segregate the homes completely from their larger agricultural context. Great improvements can be made in the design of a future Southlands site to provide access to the larger agricultural landscape through the design of passive recreational trail systems and comfortable areas to rest and view the working farms.

Fig. 41: Narrow streets and pedestrian laneways make the Village of Boundary Bay a comfortable place to live and offer lessons for future neighborhood design.

Fig. 42: Connectivity from the western edge of the property is limited by vehicular traffic, drainage ditches and vegetation.
3.1: design principles & precedents

This project explores a series of scenarios for the urban-rural edge that attempts to capitalize on the features of this unique environment by capturing a portion of the development value of land, enhancing social programs and preserving and/or restoring the functional agricultural landscapes. As such, the vignettes presented could certainly be considered an exploration of “sustainable development.”

The author offers the following cautionary criticism:

Policy makers and practitioners promote the concept of sustainability as an all-encompassing strategy that somehow seems to pacify concerns while escaping definition. The term attempts to capture a holistic approach to problem-solving, balancing social, environmental and economic concerns and yet the result is an idea that extends into the value-laden realm of cultural interpretation and quickly loses its objectivity. Sustainability - as a goal - is so loaded with underlying assumptions, that beyond
the suggestion of an attempt to “do better,” the term is increasingly hollow. This critique is best summed up by William McDonough’s anecdote:

“If I were to ask you to characterize your relationship with your parents... and you said ‘sustainable’, I would wonder what was wrong.”

More effective is an attempt to break sustainability down into the component parts of systems and ethics. Within that context, this project is the examination of a healthy, local food system, based upon the values and beliefs of agrarianism.

Guiding philosophy - Agrarianism & “New Ruralism”

From Thomas Jefferson’s firm belief of farming in the service of democracy, agrarianism provides a strong core of beliefs for the articulation of a re-populated agricultural landscape, built on the values of stewardship.

Beyond a simple occupational choice involving the knowledge and skills to grow the most food for the least amount of labor, land and capital, farming is a lifestyle. Farming demands a reciprocal agreement with the land: stewardship for fruit. Historically, this relationship was an integral characteristic of the social network of place-based communities and gave rise to the agrarian worldview.

Agrarianism is a “way of thought based on land,” (Berry in Kimbrell, 2002) and can be defined as a value system based upon “well-tended land, good food, honest work, beauty and neighborliness.” (Donahue in Wirzba, 2003)

Though not very prescriptive in the sense of physical design guidelines, agrarianism provides a philosophical foundation for the articulation of a design approach.
More recently, the idea of New Ruralism has emerged as a set of more easily applied design ideas, based upon principles similar to New Urbanism though more targeted toward rural and urban-edge communities.

Sage Center for Sustainable Agriculture Education (www.sagecenter.org) defines New Ruralism as “a place-based and systems-based framework that nurtures the symbiotic relationship between urban and rural areas.”

- **Vision.** New Ruralism is the preservation and enhancement of urban edge rural areas as places that are indispensable to the economic, environmental, and cultural vitality of cities and metropolitan regions.
- **Preliminary Principles.**
  - New Ruralism would denote specific, named rural places located near an urban area and part of a broader metropolitan region.
  - The primary land use would be small to medium scale sustainable agriculture integrated and overlapping with areas for wildlife and habitat management and for passive recreation.
  - Urban-rural connectivity would be a multi-faceted exchange.
  - New Ruralist agricultural preserves would welcome the public as both visitors and residents.
  - The development and management of each agricultural preserve would be guided by a comprehensive plan.

From the guiding philosophy of agrarianism, the vision of New Ruralism and its preliminary principles, a set of general design principles were developed as a means to better facilitate the “place-based” approach of site-sensitive design.
Design Principles:

The following principles were developed as a means to capture design strategies for both natural and human-cultural systems. While the bulleted lists are intended to illustrate certain examples of how the principles might be applied to specific projects, they do not pretend to elaborate all possibilities.

Respect Natural Systems

- Agricultural capability of soil defines developable land units on areas least appropriate for agriculture (defined by "improved agricultural capability" ratings)
- Green infrastructure provides morphological framework for design intervention. Imageability, continuity in landscape
- Development minimizes hydrological impact through site-adaptive stormwater controls ("first inch" infiltration target)
- "Farming with the Wild" principles (refer to appendix 4) encourage greater biological diversity within the agricultural landscape.
- Preservation, enhancement and maintenance of openspace and habitat affords many opportunities for passive recreation.

Encourage Local Diversity

"Rebuilding local foodsheds requires rebuilding the local diversity of crops and food businesses needed to adequately feed the local population. Farmers producing for the local market tend to increase the diversity of their plantings—a shift with advantages for the diets of local people and the ecology of local landscapes" (Halweil & Prugh, 2002).

- Housing types reflect diversity of local residents' needs, from single family houses (including small cottages, etc.) to higher density mixed-use condominiums.
- Native habitat on the site is enhanced with particular attention paid to stucture and habi-
tat heterogeneity. Irrigation ponds provide additional freshwater habitat and hedgerows and “Farming with the Wild” principles provide necessary cover and food for wildlife populations.

- A diversity of local services - specifically surrounding the production, processing, storage and distribution of local food - builds a healthy local economy.
- Cultural diversity is promoted through the production and exchange of culturally diverse food crops and a local festival of food.

**Promote Connectivity**

- Interconnected transit systems (motorized and non-motorized) provide alternatives to the automobile and reduce the number and length of trips.
- Connectivity between and among hierarchy of green spaces (both public and private) - streets, greenways, agricultural areas and habitat - further increases transit options and increases health of ecological systems.
- Social connectivity is facilitated by way of public spaces and programming as a means to encourage neighbourliness, security and well-being.

**Foster Economy**

- Compact neighborhood design facilitates alternatives to the automobile and expensive infrastructure. Basic services, employment, recreation and transit systems are located within a 5-minute walking distance of most residential neighborhoods.
- Economic model driven by synergy of small-scale, intensive organic market garden model in conjunction with mixed commercial/residential transit-oriented development.
- Urban density is concentrated at the 56th Avenue and western Boundary Bay Village edges.
- “Lighter, cheaper, greener infrastucture” (Condon, 2006) reduces expensive maintenance requirements of roads and other grey infrastructure.
Focus on the Edge

- Integration of varying program elements increases occurrence of edges and the dynamics of edge conditions or “Edge Effect” (Foreman et. al., 1996, Wiens, 2005). Ecological principles of “edge effect” are utilized to design more functional and experientially diverse edge conditions (ex: movement along the edge, transition of edge, hard edge/soft edge, etc.).
- Development presents a “friendly face” to the farm and capitalizes on the open space amenities of agricultural landscapes.

Policy Design Intent: The Private & Public Good in Agriculture

As the free market continues to facilitate land conversion and urbanization, private interests are placed above public good. As ecological health declines in urbanized areas, the public goods of open space, clean air and water, as provided by agricultural land, become more precious. Unfortunately, the market does not compensate farmers for these services, often overlooked as the economic jargon of “positive externalities.” Robert Burchell, in Sprawl Costs (2005), defines the situation succinctly:

“The environmental and social benefits of agriculture are public goods. By definition, public goods are those goods that everyone wants but few are willing to produce because the market does not provide a compensatory mechanism for producers. Economists refer to this phenomena as market failure. To ensure the production of public goods, the government usually intervenes by supporting such production with taxes levied on all of society. In the case of agriculture, however, the public benefits—fresh air, open space, recreational facilities, and so on—are produced free of charge to the public.... farmers are not compensated for these goods, despite their importance to society. When farmers sell their lands, these benefits are lost.”

This challenge to present-day farming operations, however, points in a new direction of hope - the hang-up of private land ownership can act as a hinge on which to transform the development model of agricultural edges.
Already local governments collect development cost charges (DCC’s) from new development projects as a means to finance the costs of public goods required to accommodate growth. Specifically, DCC’s help municipalities pay for sanitary sewers, storm sewers, water lines, roads and parkland. There exists a real opportunity to use the same financing mechanism to help compensate farmers for the provision of public goods.

In this proposed model, development acts as a financing mechanism for the ongoing stewardship of our foodshed. While this strategy is easily applied to greenfield development using housing clusters and agricultural covenants, implementation at the regional scale becomes more challenging, raising many questions. Would the funds be used to purchase farmland? Or would they subsidize farm operations? Which farms would receive support? How would land acquisition be prioritized?

**Precedents**

In addition to the principles mentioned above, many precedents exist from which to gather valuable lessons. Six precedents are discussed in further detail, including: Broadacre City, The Garden City, Prairie Crossing, The Intervale, Village Homes and and Siskin Lane Strata development. In addition to providing a brief context for each project, specific implications to the Southlands site are noted.

*Broadacre City (Frank Lloyd Wright) and The Garden City (Ebenezer Howard)*

Broadacre City was never built and yet, despite being one of Wright’s lesser-known works, it is highly contentious in the realm of planning and design. At first glance, the proposal of such low-densities - from 0.2 to 1 dwelling units per acre - seems precisely the recipe for the sprawl that plagues suburban landscapes today. Not to be dismissed, however, many of the concepts and ideals behind the development of Broadacre City are as relevant today as they were in the first half of the 20th century.
Wright clearly identified the cultural drivers behind his vision in a desire for personal mobility articulated in the automobile, an individualistic desire to homestead and an urge to escape the city (Krohe, 1999). The same can be said for Ebenezer Howard’s Garden City. Interestingly enough, the gross density of the Garden City as suggested by Howard, was similarly low - slightly less than one dwelling unit per acre (based on 2,000 people per 5,000 acres). That said, spot densities climbed to a more reasonable 15-20 dwelling units per acre, based upon average lot sizes of 6m x 40m (Hall & Ward, 1998).

The concept for the Garden City went beyond large-scale land-use planning to address issues of livability, including the proposal of crystal palaces for winter gardening, shopping and other forms of passive recreation (Hall & Ward, 1998).

Implications to the Southlands site:

Whereas Broadacre City was built around the idea of an acre per household, this design proposal attempts to scale development based upon the productive capacity of the land: 25 dwelling units per acre of land in production (Gallagher, 2006).

As did Broadacre City and Garden City, this proposal seeks a similar end, to bring “advantages of the centralization known as the city into the regional field we call country” (Girling et. al., 1994). That said, Wright’s model looked to the automobile...
and individualized transportation (even the helicopter) as a central component of the design. This proposal, instead, focuses on more current thinking in urban design, multi-modal transit and transit-oriented development.

Finally, this design honors a conventional architectural form in keeping with the surrounding neighborhood identity and market preference for single-family detached housing in South Delta. More commercialized edges allow for medium-density mixed-use residential development, while residential areas attempt to increase density with cluster housing and cottages. Regardless, gross densities at the site-scale will remain below 5 dwelling units per acre (due to large agricultural/openspace reserves).

**Prairie Crossing - Grayslake, Illinois**

Located just 40 miles outside Chicago with connections via commuter rail, this 677 acre subdivision was developed as an alternative to an initial proposal, locating 3,000 houses on the property in a conventional development pattern which resulted in a 15-year legal battle. The 135-acre farm is stewarded by a salaried manager and fifteen acres have been reserved for a community organic farm. Part of the stewardship costs are covered by a 0.5% levy of all housing sales. A small commercial village core provides local retail and office space for the community (Brown, 1998, Atkins, 2003).

From the Prairie Crossing website (www.prairiecrossing.com):

"Prairie Crossing is the critically-acclaimed 'Conservation Community' that was designed to combine responsible development, the preservation of open land and easy commuting by rail. It is now considered a national example of how to design our communities to support a better way of life.

"Over 60 percent of the 677-acre site is protected open land that is actively used by people and wildlife. Ten miles of trails wind through a landscape of farm fields, pastures, lakes and ponds,"
native prairies and wetlands.

"With more than 165 acres of restored prairies, 20 acres of restored wetlands, and 16 acres of historic hedgerows, the Prairie Crossing landscape is contributing to the restoration of the native ecology of the region.

"A certified organic farm, in operation for over a decade, provides homeowners with views over cultivated fields of vegetables and flowers and a seasonal on-site Farm Market. At the market, residents and the general public buy vegetables, fruits, flowers and other products like honey and eggs."

Implications to the Southlands site:

The critically acclaimed and financially successful Prairie Crossing development illustrates the growing market for carefully considered development that incorporates the smart growth principles of New Urbanism, rooted in an agricultural context.

Having also been the focus of a long-term, local political battle, development of the Southlands site requires careful consideration to preserve the character of the agricultural and open-space values as articulated by the surrounding community.

Projects like Prairie Crossing demonstrate that these values are far from mutually exclusive and that working landscapes serve to differentiate ‘conservation community’ development from the more conventional real-estate market.
The Intervale - Burlington, Vermont

The mission of The Intervale is "to develop farm-and land-based enterprises that generate economic and social opportunity while protecting natural resources" (www.intervale.org).

From the Intervale website:

"The Big Picture: As people disconnect from active lifestyles, nutritious food, and the natural world, they become less healthy. Community fabric becomes frayed. Food producers struggle financially while people nearby consume highly processed food products with minimal nutritional value manufactured in distant facilities."

"Since 1988, the Intervale has reclaimed over 325 acres for agricultural use. Today, twelve organic farms produce 500,000 pounds of healthful food for the community worth over $500,000 to the local economy. These farms thrive due to the land, equipment, business and marketing services provided by the Farms Program. Half a dozen farmers have graduated from the program onto farms around Vermont. In 2002, the Intervale began to leverage its successful track record of incubating and growing farms to the statewide level, and created Growing Success on Farms. This prototype farm viability enhancement project offers comprehensive technical assistance to farmers who need help starting, diversifying, transitioning to or expanding sustainable farms. It also serves as a national and international model for growing small farms operations. Capital is being raised to develop the Farms Center to provide the infrastructure necessary to administer, develop, and expand farm programs."

Fig. 47: The Intervale logo speaks to it's core mission of connecting land and community. (www.intervale.org)

Fig. 48: The Intervale sits just a stone's throw from the city limits of Burlington, VT (shown in the upper portion of the photo). (Image courtesy GoogleEarth)
Implications to the Southlands site:

Located within the city limits of Burlington, Vermont, The Intervale is an exceptional example of highly-diversified urban agriculture. Similarly, the Southlands site sits in the very heart of Tsawwassen, just a 15-minute walk from the town center, and presents a unique opportunity to integrate these productive landscapes into the future growth and development.

From the one-acre “Half Pint Farm,” specializing in baby vegetables, micro greens, herbs and cut flowers, to the 65-acre “Intervale Bean and Grain Farm,” to the Intervale Conservation Nursery and Compost Products, the diversity of growers and products found in the Intervale is a testament to the potential for the Southlands site to develop local community with tangible goals of a localized food system, habitat enhancement, and educational and recreational opportunities.

**Village Homes - Davis, California**

Mark Francis (2003) explains, “Village Homes is a model community design that is unique [from most current New Urbanist proposals] in that it proves that open space oriented development can be effective in creating a sense of community, reducing energy use, and fostering environmental values.”

In contrast to New Urbanist design principles that focus public space on the streetscape, Village Homes clusters housing around community vineyards, orchards, gardens, playgrounds and picnic areas. Agriculture plays a significant role in the management of common spaces and while part of the productive capacity of the land was diminished due to the actual building footprints, the diversity of production has increased. Studies have estimated that the site, maximized for agricultural output, could provide residents with 80% of their fruit and vegetable needs (Corbett and Corbett, 2000).
Implications to the Southlands site:

As a compliment to the other precedents listed, Village Homes demonstrates a more community-focused program with a seemingly more visible intimacy to the natural surroundings and more specifically, agricultural landscapes as programmed common space. In addition, while the gross densities presented are essentially equal (approximately 4 dwelling units per acre), the percentage open-space is significantly smaller than “conservation developments,” at approximately twenty-five percent.

Another lesson learned from Village Homes is the difficulty in maintenance of the agricultural common spaces by salaried gardeners. While the original design hoped for agricultural revenues (primarily from almond harvests) to cover management costs, the year-end deficit for 1990 was approximately $70,000. (Corbett and Corbett, 2000) The Southlands proposal should consider both the requisite scales at which market gardening becomes economically viable as well as the need for a community of growers to provide a critical mass for the survival of a local farming community; the latter helping to address a criticism of Village Homes’ often depopulated common spaces (Francis, 2003).

Fig. 49: Careful orientation of houses for maximum solar gain and an interconnected hierarchy of public and private green spaces are distinguishing features of the remarkably successful Village Homes development. (www.communitygreens.org)
Siskin Lane Conservation Development (Renewal Land Company - Cortes Island, BC)

Renewal Land Company was formed in 2003 to explore alternative solutions to clear cutting on large tracts of private forest land.

Its goals included:

- Conservation of biodiversity and forest ecosystems.
- Demonstration of an ecologically-based approach to land development.
- Development of a precedent for the incorporation of community ideals and ecological stewardship in development projects.
- Creation of an opportunity for the community of Cortes Island to actively influence the nature of growth on the island.

Program elements include low impact housing and road alignment, conservation covenants to ensure sustainable forest management and the provision of public trails.

Implications to the Southlands site:

The Siskin Lane development is an encouraging, home-grown conservation development project for the Vancouver region and demonstrates that residential development and conservation interests need not be mutually exclusive. In fact, this
project is an excellent example of how fee-simple real estate development projects can act as a significant mechanism for conservation and restoration efforts.

That said, the integration of forested landscapes and residential development can be more easily designed based on defined management requirements of harvest cycles and spatial requirements for logging operations. In addition, the successful project is, by design, almost entirely hidden from public view through tree retention. In the case of the Southlands project, the intent is to demonstrate a visible integration of residential neighborhood design and working agricultural lands.
‘prO-”gram

Etymology: French programme agenda, public notice, from Greek programma, from prographein to write before, from pro- before + graphein to write. (www.m-w.com)

1 [Late Latin programma, from Greek] : a public notice
2 : a brief usually printed outline of the order to be followed, of the features to be presented, and the persons participating (as in a public performance)
3 : a plan or system under which action may be taken toward a goal

3.2: program development & siteplan

Programming defines the functional intent of design and, in the case of the Southlands project site, program development focuses on the integration of neighborhood and farm. The following diagram illustrates large-scale programmatic considerations intended to integrate the Southlands site into the larger fabric of Tsawassen.
Large-scale Programming Framework

**Local Food System**
Use development as a mechanism for transition to a localized food system - from production to processing and distribution.

**Commercial Nodes**
Provide a densified mixed use, commercial and residential core - with the local food system as a primary economic driver - for residents of southern Tsawwassen.

**Agricultural Gateway**
Create a formal, public gateway to the larger working agricultural landscape.

**Farmland Protection**
Preserve the best agricultural soils on site for field-based agriculture.

**Woodland Protection**
Preserve unique on-site woodland habitat for wildlife and recreational values.

**Wildlife Corridors**
Improve habitat connectivity across the site as a link between the woodland edge and Boundary Bay Regional Park.

**Transit Connectivity**
Improve connectivity between Tsawwassen's town centre, the Southlands and Boundary Bay Village.

**Park Expansion**
Provide additional grassland habitat as a means to encourage partial restoration of Boundary Bay coastal marsh ecosystem.

**Critical Mass**
Increase residential population and density as a means to support and strengthen the local commercial services and community of Boundary Bay.

**Edges**
Explore improvements to the residential - agricultural edge relationship.

**Fig. 51:** Large-scale program elements provide a framework for more site-specific design in the development of a siteplan.
Fig. 52: The Southlands site plan illustrates the overall programmatic organization of the site, including commercial, residential, agricultural and recreational program elements.
Additional program development and organization was distilled from consideration of effective mediators of the urban-agricultural edge. The following diagram considers some of the possible site-scale mediators of the urban-agricultural edge.

Fig. 53: Designers can attempt to mitigate the separation along the urban-agricultural edge with the development of program elements which integrate.

As a means to further develop these “mediators of the edge,” the following program considers the major program categories of live, work, play and move and how each underlying program element can act to integrate the urban-agricultural edge.
Fig. 54: Residential development and habitat management areas are designed to compliment the greater agricultural program of the Southlands site.
**Live - Neighborhood & Habitat**

Neighborhood:

(Refer to areas designated “residential development” in figure 54.)

All residential development is proposed in areas of the property designated due to their low agricultural capacity as compared to other areas of the site. For the purpose of this exploration, improved ratings of class 3 or lower represent soils with high potential for field-based agriculture (market gardening, etc.). Soils with a rating of 4 and above - located primarily on the 56th Street edge and the Boundary Bay Village edge - have been designated as more appropriate for development.

Additionally, proposed housing densities & population numbers were considered based on the approximate community supported agriculture (CSA) carrying capacity of 25 families per acre. (Refer to appendix 5 for production acreage and housing numbers.)

Finally, residential development was concentrated on the edges of the larger agricultural landscape as a means to maintain the integrity of the farm systems and prevent unnecessary fragmentation and conversion of agricultural soils from housing development and its associated infrastructure.

- Single-family housing (~600 dwelling units/1500 residents)
  - housing clusters/cottages
* views to farmland, Boundary Bay & beyond
* ground-oriented, front to public space (street, recreational space and/or farm)
* 1100 - 1600 sq. ft.
* small, surface level garage parking (shared)
* predominantly N-S oriented lots maximize southern exposure/sunny outdoor space
* approximately 4,000 sq. ft. / 120 x 33 ft.

- Ground-oriented multi-family housing (~1100 dwelling units/2600 residents)
  - located adjacent to commercial services and transit centers.

- High-density midrise towers increase population density at the neighborhood core and provide additional housing choice (with special consideration for the aging population).

- Common house - beyond the central feature of the farm market building, the common house provides flexible programming space for community gatherings/celebrations and educational programming associated with the Southlands Farm and community gardens.

  - community kitchen -
    
    "Community kitchens are a creative, healthy alternative to feed the soul as well as the stomach. As hands are busied with food preparation, an easy social atmosphere is created. Community kitchens are a place to make new friends, engage in conversation and learn new skills. In community kitchens, meal creation becomes a social activity that benefits everyone's health and social well-being" (communitykitchens.ca).
Habitat:

(Refer to areas designated "management areas for habitat value" in figure 54.)

Major consideration for habitat improvement in this proposal lies with the expansion/restoration of the Boundary Bay tidal marsh (not detailed within the scope of the project), the expansion of oldfield/raptor habitat (partially detailed below) and the use of "wild farming" management practices as detailed in the following program elements of field margins, cover cropping, hedgerows and drainage ditches.

Many of the specific habitat improvements are captured within "best-management agricultural practices" and are not specifically referenced in figure 54 above. Some of these include:

- Field margin/grassland set-asides - Field margins create a more diverse natural/native framework for the agricultural program contained within. Margins provide "short-term benefits in crop yield or quality, longer term benefits for sustainability of the farming system and, ultimately, broad societal benefits including aesthetics, recreation and the conservation of flora and fauna" (Gurr, et. al., 2003). Specific to South Delta, these grasslands provide important feeding, resting and nesting habitat for many small mammals and birds of prey, including the Townsend’s vole, northern harrier, rough-legged hawk, red-tailed hawk, short-eared owl, and

Fig. 59: Field margins play an important role in the conservation of grassland habitat and protect and improve water quality of adjacent waterways.

Fig. 60: During their annual migration, snowgeese flock to feed on the covercrops of Delta's agricultural land. (www.deltafarmland.ca)
barn owl (www.deltafarmland.ca). Best management practices include:
  o 10 meter minimum width.
  o Separation from established circulation (to protect during nesting season).
  o Consideration of minimum cutting height during harvest time (also for ground nesting).

- Cover cropping - Cover crops/green manures help conserve soil moisture and recycle nutrients otherwise lost during the winter season. Cover crops can also fix nitrogen in the soil and limit undesirable weed species from colonizing open plots. In addition, cover crops provide forage for migratory waterfowl and other resident wildlife.

- Agroforestry - Management of adjacent forestland for non-timber forest products (NTFP's) can preserve local forest habitat while contributing to agricultural and social programs, involving local residents in management and stewardship activities. Examples include cultivation of edible mushrooms, ferns and other understory species, including Oregon grape.

- Windbreaks/hedgerows - Similar to the grassland field margins, hedgerows serve as a multifunctional framework for the agricultural and recreational systems. “In temperate systems, it is well documented that hedgerows and woodlots, long recognized for their usefulness in preventing erosion, can also harbor natural enemies that provide significant pest control in adjacent agroecosystems” (Matson et. al., 1997).

Irrigation ponds & canal system - Expansion and restoration of the open channel drainage system and the creation of detention/irrigation ponds significantly increases the quantity and quality of aquatic and riparian habitat. Furthermore, phytoremediation and detention can help manage and treat stormwater and greywater, provide passive recreational opportunities and serve as irrigation storage for a more localized food system.

Boundary Bay Regional Park - Breaching the 12th Avenue dyke would represent a significant effort to restore the tidal lagoon/salt marsh system at Boundary Bay and would affect approximately 19.2 hectares of the Regional Park (Page et al., 1998).
With the potential to establish a significant area of grassland habitat on the Southlands property, this option becomes more attractive considering the potential expansion and diversification of habitat types.

Restoration of native plant communities would require selection of species displaying a high tolerance for salinity, inundation, low pH (typical of saturated soils) and mechanical disturbance (from waves & drift material) (Page et al., 1998). Species include glasswort (*Salicornia virginica*), salt grass (*Distichlis spicata*), gumweed (*Grindelia integrifolia*), tufted hairgrass (*Deschampsia caespitosa*) and meadow barley (*Hordeum branchyantherum*).

This option would require careful investigation and design as a means to balance habitat restoration goals, flood-proofing requirements and recreational opportunities. Costs have been estimated as high as $1.2M including engineering and construction costs and relocation costs of the pump station (Page et al., 1998).

*Riparian/wetland/grassland and mixed-habitat corridor* - These areas are part of the larger restoration plan for the site, integrating the working agricultural landscape into the adjacent forest, oldfield and marsh systems at Boundary Bay. Both of these areas are also programmed for educational and recreation uses.

Finally, attention should be given to the habitat value of the urban fabric, including:

- street trees - species/cultivars chosen for habitat/food value, saturation tolerance and maximum height to preserve solar rights of adjacent lots.
- native plantings - adapted to and supportive of local ecology.
- open-channel drainage - supports hydrological health of the landscape.
Fig. 61: Employment opportunities for local communities are centered around local agricultural production and value-added processing, but are diversified to provide other commercial goods & services.
Work - Agriculture & Commerce

The small lot organic farm units form a large patchwork agricultural landscape and act as the unifying element for the two adjacent neighborhoods.

Agricultural:

Production on site is based upon the development of a basic farm-unit as per the programmatic requirements below (also refer to discussion of Farm Scale & Community of Growers in section 3.3).

- **Production** (-170 acres, excluding circulation, habitat set-asides, etc.)
  - set up @ 18” spacing
  - Three rows for 4.5 ft. width: ease of harvest
  - 18” walkway (compacted soil)
  - Eight year crop-rotation: ideal as per Elliott Coleman’s “New Organic Grower” (1989)
  - 100 ft. row length: harvest (experiential) threshold, seed sales standard
  - total “farm unit”: 16 plots per approx. six ac. production
  - production during growing season provides for approximately 25 families/dwelling units per acre
- **Access & circulation** (-80 acres, including habitat set-asides)
  - Four ft. wide pathway per 24 rows: wheelbarrow circulation and Integrated Pest Management (IPM) cleared strip for vole management
  - Eight ft. wide service access border per two plots: harvest collection and small tractor turning radius
  - 30 ft. grassland set aside per 16 plot farm unit: occasional overlap with greenway circulation & interface with larger circulation superstructure
- **Drainage & irrigation** is improved with expansion & restoration of existing irrigation system and the establishment of a network of eight irrigation storage ponds.
• On-site water storage/detention helps alleviate rainfall deficit during the growing season. (Refer to appendix 6 for water budget and detention/storage sizing calculations.)

• Secure equipment storage, compost facility & starter greenhouse(s)
  - shared resources per six acre farm-unit including small tractor and/or roto-tiller, miscellaneous hand tools, direct seeders, wheelbarrows, etc.
  - shared resources for farm collective includes large-scale irrigation infrastructure and repair shop, cold storage and value-added processing (see processing center/community kitchen below).

• Processing center/community kitchen - Beyond the social benefits of the community kitchen (as mentioned previously), shared value-added processing facilities minimizes individual growers' investment in equipment and the time/cost required to gain health-regulation certification of processing facilities. Additionally, processing can extend the distribution of farm products throughout the year through canning, drying, freezing, etc.

• Local distribution of farm produce and value-added products can be facilitated through a variety of avenues, including:
  - community supported agriculture (CSA) - Growers are supported through the purchase of farm shares and participants in the program share in the risks and returns of the growing operation.
  - farm market - Regular markets bring residents and visitors to the Southlands and provide opportunities for
growers to sell produce and value-added products.
- farm gate sales & special events
- restaurant-direct sales (farm cafe)

* Outreach & education occurs through a combination of farm tours & school programs.
* Wildcraft working forest & orchard - This area serves as a community forest where, non-forest timber products - from apples and cherries to ferns and mushrooms - are produced for local markets. Additional wildcraft production could be expanded into the adjacent Forest Park and hedgerows systems of the Southlands Farm.

Commercial

* Neighborhood commercial retail and office space is incorporated into the medium density mixed-use residential development on site. The centralized farm processing centre provides additional (industrial) employment opportunities for the local community.
  - Approximately 185,000 square feet of commercial/retail/industrial space for local employment (based on 100 square feet allowance per dwelling unit).
  - Ground floor commercial/retail with second floor office space where required.

The public market sits as a visual architectural focal point for the mixed-use residential/commercial development along the western edge of the site, linking the built edge with the larger agricultural
landscape. Within the context of the local community, the market links each product, person and place – the health of the surrounding landscapes is manifest in the presence of the community of growers.

Public markets create dynamic places, stimulate local economic activity, reinforce community identity and facilitate social interaction (Spitzer et. al., 1995). SAGE (2005) notes that:

“Located in town centers and neighborhoods throughout the world, farmers’ markets serve multiple needs and provide multiple benefits. They bring fresh food into urban areas, connect city residents with local farmers, and catalyze community-gathering places. They are also a front-line response to the epidemic of diet-related health problems, to the challenges of community economic development, and to financial pressures on small farmers.”

- covered (year-round use) and uncovered (seasonal use) market stalls
- service access for vendors
- pedestrian access along central greenway
Fig. 68: Public recreational opportunities are provided throughout the redeveloped Southlands site, from community gardens to an extensive trail network.
Play - Recreation & Openspace

Passive

- community dinner/picnic/informal gathering areas - are located throughout the village commons, adjacent to the community gardens and throughout the recreational trail network.
- benches, seating walls and simple shade structures - will provide visitors and residents places to rest and to enjoy their surroundings.
- birdwatching areas - observation platforms, blinds and interpretive signage located along public-access portions of Southlands trail system.
- views - all passive recreational program elements will consider ideal sighting so as to capitalize on external views to Boundary Bay as well as the internal views of the working farm and forest landscapes.

Active

- walking/jogging trails - more than 5 km of walking trails linking the Southlands Farm and Boundary Bay Backporch neighborhoods, as well as the Tsawwassen Forest Park and Boundary Bay Regional Parks.
- cycling trails - are located along the multi-modal transit routes (refer to next section of program development, titled “move”)
- seasonal “U Pick” agriculture (blackberries, strawberries,
raspberries, pumpkins) are linked to the trail network and invite residents and visitors into the working agricultural landscape.

- community garden plots (100 sq. ft. each) - provide a recreational opportunity for people of all ages and are located adjacent to higher-density residential areas.
Fig. 71: Public recreational opportunities are provided throughout the redeveloped Southlands site, from community gardens to an extensive trail network.
Move - Circulation, Transit & Parking

- Multi-modal transit - includes bus service along the southern edge of the Southlands Farm with connections to Boundary Bay Village and a parallel cycle/pedestrian route.
- country-lane "back" service access
  - 4m right of way, 2.5m width
  - gravel surface
- green streets - Beyond their negative impact on hydrological health & performance, narrow streets create more a human-scaled public space and function beyond the capacity for "moving traffic and storing cars" (Girling, et. al., 1994).
  - 23 ft. maximum width, "courtesy" lanes
  - on-street parking
- "Woonerf" (translated as "street for living") is a Dutch term for narrow streets designed as public space for pedestrians, cyclists and low-speed motorized vehicles. Successful local examples of the woonerf are found at the Granville Island Market and service access is not hidden from public view.
  - narrow streets without curbs where vehicles are slowed by "side friction" or the location of obstacles such as parked cars, trees and planters, bollards and bicycle racks.
- Recreational greenways/accessible trail system
  - 12 ft. maximum width in higher traffic areas, eight ft. average width throughout
  - permeable paving surface with gravel base for storage.
  - interpretive signage with wayfinding, natural history and agricultural information.

Fig. 72: Simple windbreak/hedgerow treatments along the agricultural drainage system enliven the trail experience and delineate transition from public to private space. (photoshop visualization)

Fig. 73: A residential "woonerf" challenges the notion that streets be for cars. (http://plambeck.org/archives/2005_02.html)
3.3: design details & discussion

The following section articulates many ideas explored throughout the previous chapters - from general design principles to specific program elements - at a finer-scale, specific to the Southlands site.

Each set of drawings is followed by a brief discussion as a means to reiterate the specific intent of each element of the design within the context of the overall project.
Illustration Locator Map

The map below references the master plan in order to spatially locate the following character sketches, plans and sections. Unless otherwise indicated, drawings are oriented with North at the top of the page.

Orchard Edge Scenarios
- Single-loaded Residential Edge
- Orchard Edge Trail

These two drawings examine the relationship of cottage housing to the agricultural edge.

Village Commons
This sketch articulates the main programmatic features of the heart of the Southlands Farm neighborhood.

Community Gardens
The sketch explores the relationships between commercial and residential development on the edge of the working agricultural landscape and uses community gardens (and other related components) as a programmatic element to link the two.

Forest Edge Scenarios
- Boundary Bay Backporch Forest Edge
- Boundary Bay Backporch Laneway
- Wide Road Trail

These three drawings examine the relationship of conventional single-family housing (within a more forested context) and their relationship to the agricultural edge.

Walkable Streets
This sketch explores the character and components of pedestrian-friendly neighborhood streets.

Fig. 74: Design details are representative of edge treatments and program elements throughout the site.
Village Commons

While the village commons is designed as a gathering place for residents and visitors to the Southlands, it is also intended to serve as a highly imageable gateway to the neighborhood.

Native Habitat

Portions of the village green are maintained in native vegetation and managed for habitat value. These areas are integral to neighborhood identity and stewardship activities serve as opportunities for community building.

On-Street Parking

Parking along the village green allows access to commercial services and slows traffic for a more pedestrian-friendly environment.

Farm Market

The community Farm Market sits at the eastern end of the village green and serves as an outlet for agricultural production and value-added industries of the Southlands Farm.

Rooftop Production

Rooftop greenhouses capture waste heat from residential buildings, extend the growing season into the winter months and minimize impact to arable land.

Plaza Edges

Ground-floor commercial fronts onto the village green and takes advantage of southern exposure with outdoor programming opportunities.

Farm Views

The village green provides direct public access to the expansive views into the Southlands agricultural landscape.

Accessible pathways, park benches, docks and picnic areas provide many opportunities for passive recreation at the heart of the Southlands Farm neighborhood. The larger park area enjoys full southern exposure, while smaller areas provide resting places during the busy market.

Fig. 75: Village Commons
Village Commons

The expansive public park feature of the Southlands Farm neighborhood serves as a central gathering place for residents and visitors while creating a formal gateway to the working agricultural landscapes beyond. 56th Street crosses the western edge of the commons and a bridge treatment along the roadbed indicates the arrival to the neighborhood. Views to the east reveal a mixed-use neighborhood, farm market, community gardens and more distant views to the working farms and Boundary Bay.

Gardenview Drive circumnavigates the village commons, passing in front of the neighborhood commercial services, and farm market before turning around in front of the Southlands Farm community gardens to continue in the westward direction, back to 56th. A walk along the commons, from 56th Street to the farm market takes less than two minutes and a leisurely stroll around the village commons takes little more than five.

A central water feature and trail system unifies the space and at the same time divides it into more intimate-scaled outdoor rooms, providing ample space for informal gatherings and passive recreation. Portions of the village commons are planted in native vegetation and also offer opportunities for community members to engage in stewardship activities as part of more public community service.
Community Gardens

The community gardens and farm market of the Southlands Farm neighborhood serve as the gateway to the larger agricultural landscape of the Southlands by blurring the line between the urban and rural edge.

Starter Glasshouse & Garden Plots

A central glasshouse provides space for community gardeners to prepare for the growing season and start seed trays for transplanting. Garden plots (10' x 10') are arranged outside the glasshouse and are allocated on a first-come, first-served basis.

Townhouse Development

Townhouse development along the edge of the Southlands Farm community gardens present a friendly face to the farm and take advantage of the southern exposure and opportunities for passive recreation.

Community Kitchen

Small-scale industrial food processing facilities are available for local residents and are shared with the local farming community. Ideas and knowledge are passed along through the preparation and sharing of food.

Orchard Trail Greenway

The Orchard Trail links the northern edge of development with the central community gardens and the Boundary Bay Regional Park on the eastern edge of the property.

Trellis Edge & Picnic Niches

A semi-continuous trellis supports climbing plants and provides a more comfortable enclosure for the gardens themselves. In addition, niches along the gardens four sides help create smaller spaces, ideal for community dinners and picnics.

Field Agriculture

Adjacent to the community gardens, field space can be used by community gardeners for more space-intensive crops, such as corn and pumpkins. Other portions of field production can be leased to local farmers.

Farm Market

The community Farm Market sits at the eastern end of the village green and serves as an outlet for agricultural production and value-added industries of the Southlands Farm.

Fig. 77: Community Gardens
Community Gardens

As part of the transition from the mixed-use commercial/residential village core to the semi-private residential neighborhood edge, the location of the Southlands Farm community gardens also represents the transition from the village commons to the semi-private agricultural landscape.

As a means to encourage individual food production, plots in the community garden are prioritized for local residents of higher-density apartments, townhouses and condominiums, where yard space for growing is often limited or non-existent. Garden plots are available on a first-come, first-served basis and surplus plots can be reserved by other members of the local community and/or nearby residents.

Furthermore, in addition to the 10' x10' raised garden plots, field space is available beyond the trellis' edge. Residents with ambitions of larger-scale growing can arrange for the use of this area.

Situated between the patchwork of small lot organic farms to the east and the processing and marketing facilities, the community gardeners are surrounded by all aspects of the local food system.

Events throughout the growing season - such as seasonal harvest celebrations, work parties and regular farm markets - facilitate exchanges between community gardeners and neighboring farmers and strengthen the awareness and understanding of the functioning of the local food system.

Fig 78: Community gardening provides opportunities for intergenerational social activity, from planting and watering to harvesting, preparation and enjoyment of fresh food. (photo courtesy UBC Farm)
Walkable Streets
Based on the Dutch concept of the “woonerf,” the walkable streets of the Southlands Farm and Boundary Bay Backporch neighborhoods reconfigures standard neighborhood streets into places where cars are not considered the primary user.

Connectivity
Walkable streets provide pedestrian-friendly linkages to network of accessible trails that connect the town centres to the surrounding farmland and neighborhoods.

Street Parking
Parking areas located throughout the streets provide the same number of parking spaces as conventional on-street parking, but the irregular configuration requires motorists to greatly reduce speeds and give pedestrians the right of way.

Street Trees, Furniture and “Side Friction”
The clustering of parking spaces, increased plantings of street trees and planter beds, bike racks, benches and other furniture, increase “side friction” along the walkable streets and send a clear signal to motorist and cyclists to slow down and use caution.

Neighborhood Commercial
Small neighborhood commercial services are located along the walkable streets and take advantage of increased local residential densities to support their operations.

Diverse Housing Types
Townhouses and apartments along the agricultural edge maintain a friendly face to the farm and increase residential density. Providing a diversity of housing types creates more opportunity for community diversity and the potential to involve more groups in stewardship activities.

Stormwater Management
Walkable streets offer many more opportunities for on site infiltration and treatment as compared to the standard pipe and gutter grey infrastructure. Beyond the parcel scale, surface runoff from residential development is easily treated with grassed swales along the agricultural edge and incorporated into irrigation storage.

Fig. 79: Walkable Streets
Walkable Streets

The pedestrian-friendly street design throughout the higher density mixed-use commercial and residential neighborhoods helps foster a greater sense of community and promotes the agrarian value of neighborliness.

In both the Southland Farm and Boundary Bay Backporch neighborhoods, green streets also provide a greater degree of connectivity from adjacent neighborhoods into the Southlands and vice-versa. As a means to encourage support of the farm markets (and the greater food system as emphasized in this design) from the community of greater Tsawwassen, access to the site both visible and inviting.

Street trees and planters offer residents opportunities for gardening and food production even in an urbanized setting while access to community gardens is never much more than a five minute walk away.

Finally, green streets help maintain the hydrological function of the agricultural landscape. Infiltration of stormwater feeds the larger drainage system where water is captured and stored for irrigation during the dry summer months.

Fig. 80: Rowhouses are shaded by an enormous cherry tree and planters are crowded with edible and decorative plants. (www.beyonddc.com)
Orchard Edge Scenarios

The following edge treatment scenarios explore the transformation of a residential back into a laneway with cottage housing facing onto farmland. Developed as a site-specific solution for the existing edge relationship with the Forest by the Bay neighborhood, the “single-loaded residential edge” could be applied across agricultural edges as a means to directly engage appropriately-scaled agriculture.

The following drawings are taken from the section below and illustrate the residential component of the edge treatment, as well as an option for the treatment of a more public treatment of the agricultural edge.

In both of these scenarios, the intention is address an existing edge condition through an alternative development model designed to integrate the residential - agricultural edge.

Fig. 81: The existing edge treatment speaks of neglect, doing little to acknowledge the agricultural landscape.

Fig. 82

Single-loaded Residential Edge

Orchard Trail Edge
Single-Loaded Residential Edge

This model of development was explored along the existing edge between the “Forest by the Bay” neighborhood and the adjacent agricultural land. A simple single-loaded cottage development reorients the face of housing to the farmland and provides laneway service access to existing housing.

Existing Development
The relationship between existing development and the adjacent agricultural land is characterized simply as “backing onto farmland.” Large-lot single-family detached houses form the existing edge with the Southlands Farm. (Refer to Figure 81.)

Shared Services
Garbage collection and recycling - of organic and non-organic waste - is located and accessed along the laneways.

Country Lane
Country lanes provide service access and laneway parking for residential development, and minimize the amount of impervious surfaces through the use of paving strips. (Refer to Figure 85.)

Cottage Development
Development of cottage housing increases housing density and addresses the growing demand for more compact and affordable housing for young families and aging populations alike.

Residential ("Courtesy") Street
Narrow residential streets provide on-street parking and reduce traffic speed with through the creation of side-friction. Three lanes require motorists to share the traffic lane by pulling over to allow for safe passage.

Cottage Commons
Cottage development centers around a central common courtyard area where residents can enjoy take advantage of garden plots, picnic areas and easily supervised playspace for children. (Refer to Figure 84.)

Access and Use
A semi-public pathway between houses provides street access to the Cottage Commons. Cottage residents make decisions regarding the allocation and programming of common spaces.
Single-loaded Residential Edge

This scenario explores the cottage house development model as means to preserve local housing character, provide more intimate dwelling spaces, and address the trends in housing demand for seniors and first-time buyers. That said, higher density housing typologies, as illustrated in figure 84, can accomplish the same goal of the residential - agricultural edge relationship while providing additional dwelling units.

Cottage houses in this scenario are organized principally in a linear fashion, along the agricultural edge and secondarily around the central semi-public cottage commons. Houses along the eastern edge (adjacent to the agricultural land) face onto the street and farmland beyond, while the houses behind face onto the commons. Care is given to the backporch treatment of the “front” houses to present a friendly face to the commons.

The semi-public commons space is linked to the street via pathway where residents can cross a small footbridge to access the public greenway along the orchard edge. Both Boundary Bay Regional Park and the Southlands Farm village core are never more than a ten-minute walk along the trail.
Orchard Trail Edge

The Orchard Trail parallels the cottage development bordering the existing Forest by the Bay and Tsawwassen Golf Club Neighborhoods. Due to drainage conditions of the site, the orchard itself is planted with site-adapted, fruit bearing trees with high wildlife value.

Face to the Farm

Development along the Orchard Trail faces the street and parallel trail, creating a more pleasant pedestrian experience while walking, cycling or driving through the neighborhood.

Wild Orchard

Designed to provide habitat and recreational value while tying the residential edge into the greater agricultural landscape, the wild orchard is planted with pacific crabapple (Malus fusca) and managed as a 'trap crop' to lure birds away from feeding on maketable crops.

Orchard Trail

The orchard trail is a shared-use trail, representative of the larger system of accessible trails throughout the site. The accessible gravel pathways are approximately fifteen feet wide and access from the street is provided via four-foot wide foot bridges. Benches are located along the trail (no fewer than one per two hundred feet) to provide places to rest and view the surrounding agricultural landscapes.

Grassland Borders

Native grasses provide valuable habitat and food sources for local wildlife, from insects to migratory waterfowl. Grass borders also indicate the physical separation between public trails and private farm fields.

Agricultural Drainage System

The system of drainage ditches and dykes provides a critical structural framework for the entire site, both formally and functionally. All proposed development should maintain the system of open-channel drainage for habitat value, flood control and imagability of the neighborhood. The parallel trail system also allows access to the ditch's edge for easy maintenance and required dredging.

Fig. 86: Orchard Trail Edge
Orchard Trail Edge

As part of the recreational greenway system, the Orchard Trail parallels the public street linking the Southlands Farm neighborhood with Boundary Bay Road at the northeastern corner of the site.

The Orchard Trail is accessed via small footbridges along the residential street front. Along the west and north edges, street trees, cottage houses and front porches create a human-scaled residential face to the agricultural edge and to the east and south, the orchard acts as a linear feature to widen the edge along the working agricultural edge.

The orchard edge signals a transition between the public greenway and the semi-private agricultural farm units beyond but maintaining visual access for cottage residents and recreationalists using the trail system. In addition the orchard provides a certain degree of separation for farm workers in lands adjacent to the residential street and cottage housing.

While improved site and soil conditions might permit the establishment of a production orchard for human consumption, a wild orchard provides valuable habitat and food for wildlife and at the same time, maintains the edge relationship articulated in this scenario.
Forest Edge Scenarios

Within the flat, agricultural landscape of the Southlands property, the forested southern edge of the site is a unique feature deserving specific attention in the design process.

The following scenarios explore the relationship of housing to the woodland-agricultural edge and examine a neighborhood pattern developed from the primary intention of preserving the forested edge and the internal views of the agricultural landscape.

The following drawings are taken from the section below and illustrate the recreational greenway developed along the drainage infrastructure, the lot configurations and the actual relationship of housing to the agricultural edge.

In all three scenarios, the intention is to minimize impact to existing vegetation and restore/enhance native plantings as a means to further define the Boundary Bay Backporch neighborhood character.

Fig. 89: The wooded southeastern edge is unique to the Southlands property.

Fig. 90: Backporch Wide Road Trail, Backporch Laneway, Backporch Forest Edge.
Wide Road Trail

Within the Boundary Bay Backporch neighborhood, the Wide Road Trail is created as a result of lot configurations, building footprint placement and the existing network of open channel drainage ditches.

Big Front Yards

With the building footprints situated at the back of the lots, the Wide Road Trail enjoys the more secluded separation from neighborhood housing, thanks to the large forested front yards.

Drainage System

Grassed channels move surface and subsurface water from the site into large storage ponds. Planted with native vegetation, the drainage system provides valuable habitat and recreational opportunities and acts as a unifying feature across the agricultural landscape and neighborhoods.

Conservation and Reforestation

In addition to the restoration of native vegetation along waterways and hedgerows, conservation covenants protect woodland vegetation and maintain the forested character of the Boundary Bay Backporch neighborhood.

Skinny Trail

The Wide Road Trail sits to the south of the more public multimodal transit route, connecting the Southlands Farm neighborhood to Boundary Bay Village and the Backporch neighborhood. As such, the trail itself is smaller and more intimate than the larger wider trail found throughout the Southlands site.

Skinny Streets

Neighborhood roads need be no more than 25 feet wide to allow for the passage of two automobiles and occasional street parking.

Trail Connections

The Wide Road Trail links the Tsawwassen Forest Park and the Boundary Bay Village recreational fields and, compared to the Backporch Trail's agricultural edge experience, is much more forested and enclosed.

Fig. 91: Wide Road Trail
Wide Road Trail

South of the Backporch Trail (refer to figure 68), the Wide Road Trail traverses the Boundary Bay Backporch neighborhood and offers a more secluded trail experience through the woodland edge. Moving from the Tsawwassen Forest Park trail system to the Boundary Bay Village Wood, the trail meets the open channel drainage system, where water moves from the escarpment of Point Roberts through the neighborhood and into the patchwork agricultural landscape.

The trail takes advantage of the setback requirements in the Boundary Bay Backporch neighborhood and allows residents and visitors to experience the wooded character of the southern portion of the site.

The experience along the trail is largely defined by the wooded edges canopy clearing, the parallel drainage channel and the trail’s lack of surface treatment - during the wet winter, a highly trafficked Wide Road Trail is very muddy.

While neighborhood vehicular circulation is separated only by the width of the channel and an edge treatment of native plantings, much of the local traffic passes through the laneways, where parking and service access take place. That said, the clearing of trees for the roadbed serves to brighten the trail and pathways to front porches indicate the residential presence.
Boundary Bay Backporch Laneways

The neighborhood referred to as the "Boundary Bay Backporch" is characterized by large porches and laneways within a wooded setting, unique to the Southlands site.

Yards: From Front to Back
With the building footprints situated at the back of the lots, laneways (typically situated at the back) become more public areas (associated with the front) and the large front yards become more private.

Housing Character & Density
Housing along the southern edge of the neighborhood responds architecturally to the surrounding woodlands through the use of native materials. Densities are the lowest on the Southlands site in an effort to have less impact on the forested edge.

Forest Character
Building envelope extents are carefully defined and disturbance to native vegetation is minimized during the building process in order to preserve habitat and forest character of the Boundary Bay Backporch neighborhood.

Country Lane
The intimate relationship between the building facades and the narrow lane creates a more street-like experience, while the nature of the lane itself - paving strips and/or gravel surfacing - maintains a desired informality.

Big Backporches
Large covered porches face the laneway, providing ample space for outdoor seating and dining, and promote neighborliness through a more informal relationship between houses.
Boundary Bay Backporch Laneways

The residential character of the Boundary Bay Backporch neighborhood is defined here, where spaces are organized around the central feature of the laneway within the wooded setting.

This relationship of the forested landscape to the agricultural landscape is further strengthened through small-scale local wildcraft production and the robust treatment of the habitat linkage from the Tsawwassen Forest Park to Boundary Bay Regional Park.

This neighborhood design provides a great deal of private space - where “front” yards become the private spaces associated with more conventional backyards and the backporches serve as the semi-private front along semi-public laneway. The most rural character within the designs discussed, the reversal of the front-back relationship of the lots creates an intimacy and privacy unlike the other models explored.

While this neighborhood feels completely distinct from the larger agricultural landscape of the Southlands, the Boundary Bay Backporch neighborhood is never more than a two minute walk from the agricultural edge and a five minute walk - along the Wide Road Trail or the larger greenway along the agricultural edge - from the Boundary Bay Village core.
Boundary Bay Backporch Forest Edge

The Boundary Bay Backporch neighborhood design was developed as a deliberate effort to protect and enhance the southwestern forested edge of the Southlands site.

Living in the Woods

Houses along this forested edge are set against the southernmost edge of the lot (approximately 80 ft. setback) and enjoy screened views of the agricultural landscape beyond.

Views of the Farm

The Boundary Bay Backporch neighborhood was explored as an alternative development model to protect the internal views of the Southlands agricultural landscape for farm workers as well as residents and visitors using the recreational trail network.

Bus Route

Weaving along the Tsawwassen Forest Park edge, the new transit route services the Southlands Farm and Boundary Bay Backporch neighborhoods. Additionally, the new bus route links the larger Tsawwassen transit network and will increase transit service to Boundary Bay Village.

Forest Edge Preservation

Protection and enhancement of native woodland vegetation along the agricultural edge is essential to maintain the internal views of the agricultural landscape.

Backporch Trail

As part of the multi-modal transit linkage between the Southlands Farm neighborhood and Boundary Bay Village, the Backporch Trail winds along the Tsawwassen Forest Park edge with views to the larger agricultural landscape.

Fig. 97: Boundary Bay Backporch Forest Edge
Boundary Bay Backporch Forest Edge

The Boundary Bay Backporch forest edge - and its relationship to the adjacent agricultural land - was the primary consideration in the exploration of this overall neighborhood design. Special attention was given to the preservation of the forested edge at the southern edge of the agricultural land and the establishment of conservation covenants and building envelope restrictions would be effective regulatory devices to maintain this character.

Located on the soil types identified as least appropriate for agriculture (classes 4 & 5), this neighborhood is designed to bolster the population of Boundary Bay Village and the commercial services available to the local population, while reconnecting the neighborhood to the adjacent agricultural landscape.

For the forest edge itself, the intent was to consider a residential front which looks on to the working landscape without overwhelming the agricultural landscape with a wall of housing. Large setbacks for building footprints on the 120' lots and preservation and enhancement of woodland vegetation soften the residential edge and preserve the internal views from the agricultural land. Woodland vegetation along the front edge of the lots provide residents well-framed views of the farm fields beyond.
Farm Scale & the Community of Growers

Finally, the heart of the Southlands site is the functioning agricultural landscape featured in this design exploration. Specific planting plans were not explored in favor of a functional framework within which a community of growers could determine specific crop selections and rotations.

More specifically, it should be noted that of critical importance to this proposal is the understanding of the farmer's perspective and the provision of programmatic elements required for viable agriculture. Paul Bruhn of the Preservation Trust of Vermont states simply: “Having open space is important, but to preserve the rural and agricultural character of the land and its people, we need working landscapes.” (www.intervale.org) More emphatically, Christopher Alexander (1977) declares:

“Parks are dead and artificial. Farms, when treated as private property, rob the people of their natural biological heritage—the land from which they came. In Norway, England, Austria, it is commonly understood that people have a right to picnic in farmland, and walk and play—provided they respect the animals and crops.”

The design of agricultural lands in this proposal was based on standard production garden spacings and built outward to include service access and best management allowances for integrated pest management and wildfarming techniques. Given the development of this agricultural framework within the context of the development of other program elements, the site accommodates more than 20 small lot organic farms with over 170 acres in total production.

The following diagram illustrates the development of the farm unit based on spatial constraints of the requisite program elements:
Fig. 100: From a comfortable scale for the farm worker to the economic break-point for small lot organic farm operations, this farm unit was developed and used as a general guide in the layout of the agricultural program.
"Our profession's historic isolation, since Olmstead, from the central philosophical, ideological, literary and artistic debates of our own time must finally be overcome if a new generation of landscape architects is to be capable of imagining and creating the landscape forms that would similarly express the highest values and aspirations of [American] culture..."

Catherine Howett in Simon Swaffield: “Theory in Landscape Architecture: A Reader”

4.1 new definitions & new directions

From the scale of cauliflower spacings and wheel barrow widths as defining requirements of the farm unit - to the informed design of the neighborhood unit as defined by dwellings, greenways, and walking distances to commercial services, regional transit and agricultural land - to the consideration of watershed scale hydrological assets and global migratory flyways, this design exercise attempted to explore the potential for our relationship with a more deliberately integrated urban - agricultural edge.

Rejecting the notion that agriculture and settlement should be separated, this exploration critiqued conventional models of agriculture and development and reconsidered land use through the 'new-rur-alist' perspective, characterized as "a place-based and systems-based framework that nurtures the symbiotic relationship between urban and rural areas" (Kraus, 2006).
In that regard, this project extends well beyond the scale of the Southlands site and explores our attitudes toward agriculture, land development and our treatment of the urban-agricultural edge. At the larger-scale context of the GVRD and the ALR, these ideas blur the line in the sand between developers and preservationists.

Dan Imoff states it clearly in Farming with the Wild (2003):

"Building alliances between historical adversaries will no doubt require tearing down decades-old walls and stereotypes: environmentalists, on one hand, often lumped with wealthy urbanites and bureaucrats who dispatch regulations from distant power centers, and farmers and ranchers, on the other, frequently perceived as narrow-minded and steeped in a sense of entitlement. What may in fact help to bring both camps together in alliances is a sense of unity in common goals and common foes. Common goals would include maintaining arable farmland within healthy rural communities, keeping rural lands open and free from subdivision and development, restoring native habitat on private and public lands, and creating a more natural rural-urban interface."

Careful consideration of Vancouver's 'sustainability' with respect to agricultural land and food production must also blur conventional definitions... What kind of agriculture is sustainable for Vancouver? What kind of development is sustainable for farming? What role can urban development play in the establishment of local food systems - from production to processing and distribution - within the fabric of the city? Or could limited development along the agricultural edge, in a manner that fosters appreciation and stewardship of agricultural landscapes, capture value from upzoned farmland and serve as a catalyst in the transformation to a more localized food system?
Wedge the Edge

This approach, to utilize limited development on more marginal agricultural soils as a financing mechanism, effectively transforms the urban-agricultural edge, in its present-day manifestation of backyard-fence-farmland, into something much thicker: a transitional edge consisting of deliberately designed neighborhoods integrated into the adjacent farm systems.

Fig. 103: Rezoning agricultural land unlocks tremendous value in urban development, a significant portion of which could be used towards the transformation of local food systems.
The mechanism behind this scenario is simply the value captured in the change of value in land restricted from development in the ALR and land which is excluded and zoned for urban development. As developers stand to gain a ten-fold increase in value, local municipalities often negotiate stipulations of the deal, requiring the provision of community amenities. Much of that value could be transferred back to the local community through the establishment and strengthening of local agricultural systems.

While this option necessarily results in the development of agricultural land, the economic gains as a result of rezoning and development can pay for the establishment of local processing and distribution systems, as well as front the cost of transitioning to more organic and habitat-friendly farm practices. In addition, municipalities can also place strict requirements on the types of development to occur in these areas, creating a different edge-condition all together.

At a regional scale, this model begins to thicken the ALR edge with neighborhoods integrated into the agricultural landscape. Beyond these areas of smaller-scale, localized production centers, ongoing large-scale and industrialized farm practices can take place at a greater distance from population centers.

This idea is not new to the realm of edge-planning for agriculture and Vancouver-based designer Larry Diamond suggested a similar approach decades ago (see figure 105). The major difference, however, is the scale at which these treatments occur: parcel by parcel we have little hope of redesigning the edge. We must move beyond
the default dead-end for placemaking that is land-use planning through regulation and apply bold and creative ideas to solve the problems we face in the loss of not only our agricultural lands, but our very agri-culture.

In today’s realm of landscape architecture, where the lion’s share of creative energy is being applied in big cities, where big developments command big budgets and make the big moves possible, we must focus a watchful eye to the edges of our urban areas and outlying communities. Here, change is fast but momentum is manageable and opportunities abound for creativity in defining the future.

With specific attention to the urban-agricultural edge, we must reconnect communities with their foodlands if we are to hope for their protection. As architects and planners, we must be acutely aware of the relationships we foster through the deliberate - or otherwise completely unintentional - design of spaces and places.

The notion of an “urban-agrarianism” can inform a new approach to land development within a value system that “cares about all living spaces - residential neighborhoods, schools and playgrounds, parks and landfills, as well as glaciers, forests, wetlands and oceans - the protection of all the places that maintain life” (Wizba, 2003).

In Edge City (1991), Joel Garreau investigated the booming growth of sprawling land use across several cities in North America and offered the following conclusion:

“...if we come to see it all as sacred—the land on which we build as sacred as the land we leave untouched—will we break through to higher ground and reunite our fragmented universe. That is precisely how and where we can help save our world.”

From fragmentation to integration, the most logical place we begin is at the edge.
Bibliography


Appendix 1: Research & Design Process

HYPOTHESIS
Urbanization is eating our foodshed.
This condition is manifest in a dysfunctional urban-agricultural edge condition, characterized by compromised social, environmental and economic function, general placelessness and land-use conflict.

values
mutually reinforcing
current policy

THESIS
Deliberate design of a more robust urban-rural edge, based on a 21st century interpretation of agrarian values, can reintegrate city and country, stop urban sprawl, and protect the natural systems that sustain us.

Beyond mitigation, design has the ability to take advantage of the myriad opportunities presented by dynamic edge conditions.

Critique of present-day policy and resultant conditions of the urban-agricultural edge.
Alternative: principles and approaches to land-use planning and design from the perspectives of agricultural values, conservation values and landscape design.

PROGRAM ORDER
Site program development based on integration.

SITE ORDER
Site analysis based on synthesis of natural and cultural drivers.
Appendix 2: Soil Classes & Agriculture Capability (www.alc.gov.bc.ca/alr/ag_cap_details.htm):

LAND CAPABILITY CLASSES FOR MINERAL SOILS

The seven land capability classes for mineral soils are defined and described as follows:

CLASS 1  LAND IN THIS CLASS EITHER HAS NO OR ONLY VERY SLIGHT LIMITATIONS THAT RESTRICT ITS USE FOR THE PRODUCTION OF COMMON AGRICULTURAL CROPS.

Land in Class 1 is level or nearly level. The soils are deep, well to imperfectly drained under natural conditions, or have good artificial water table control, and hold moisture well. They can be managed and cropped without difficulty. Productivity is easily maintained for a wide range of field crops.

CLASS 2  LAND IN THIS CLASS HAS MINOR LIMITATIONS THAT REQUIRE GOOD ONGOING MANAGEMENT PRACTICES OR SLIGHTLY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 2 has limitations which constitute a continuous minor management problem or may cause lower crop yields compared to Class 1 land but which does not pose a threat of crop loss under good management. The soils in Class 2 are deep, hold moisture well and can be managed and cropped with little difficulty.

CLASS 3  LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE MODERATELY INTENSIVE MANAGEMENT PRACTICES OR MODERATELY RESTRICT THE RANGE OF CROPS, OR BOTH.

The limitations are more severe than for Class 2 land and management practices are more difficult to apply and maintain. The limitations may restrict the choice of suitable crops or affect one or more of the following practices: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 4  LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE SPECIAL MANAGEMENT PRACTICES OR SEVERELY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 4 has limitations which make it suitable for only a few crops, or the yield for a wide range of crops is low, or the risk of crop failure is high, or soil conditions are such that special development and management practices are required. The limitations may seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 5  LAND IN THIS CLASS HAS LIMITATIONS THAT RESTRICT ITS CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS OR OTHER SPECIALLY ADAPTED CROPS.

Land in Class 5 is generally limited to the production of perennial crops or other specially adapted crops. Productivity of these suited crops may be high. Class 5 lands can be cultivated and some may be used for cultivated field crops provided unusually intensive management is employed and/or the crop is particular-
ly adapted to the conditions peculiar to these lands. Cultivated field crops may be grown on some Class 5 land where adverse climate is the main limitation, but crop failure can be expected under average conditions. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 5 lands are not significant limitations to these crops.

CLASS 6

LAND IN THIS CLASS IS NONARABLE BUT IS CAPABLE OF PRODUCING NATIVE AND OR UNCULTIVATED PERENNIAL FORAGE CROPS.

Land in Class 6 provides sustained natural grazing for domestic livestock and is not arable in its present condition. Land is placed in this class because of severe climate, or the terrain is unsuitable for cultivation or use of farm machinery, or the soils do not respond to intensive improvement practices. Some unimproved Class 6 lands can be improved by draining and/or diking.

CLASS 7

LAND IN THIS CLASS HAS NO CAPABILITY FOR ARABLE OR SUSTAINED NATURAL GRAZING.

All classified areas not included in Classes 1 to 6 inclusive are placed in this class. Class 7 land may have limitations equivalent to Class 6 land but they do not provide natural sustained grazing by domestic livestock due to climate and resulting unsuitable natural vegetation. Also included are rockland, other nonsoil areas, and small water-bodies not shown on maps. Some unimproved Class 7 land can be improved by draining or diking.
Appendix 3: Farm Practices Protection ("Right to Farm") Act

[RSBC 1996] CHAPTER 131

Part 1 — Definitions

Definitions

1 In this Act:

“board” means the Provincial board under the Natural Products Marketing (BC) Act;

“complainant” means a person who under section 3 applies for a determination referred to in that section;

“Crown land” means land, whether or not it is covered by water, or an interest in land, vested in the government;

“farm business” means a business in which one or more farm operations are conducted, and includes a farm education or farm research institution to the extent that the institution conducts one or more farm operations;

“farm operation” means any of the following activities involved in carrying on a farm business:

(a) growing, producing, raising or keeping animals or plants, including mushrooms, or the primary products of those plants or animals;

(b) clearing, draining, irrigating or cultivating land;

(c) using farm machinery, equipment, devices, materials and structures;

(d) applying fertilizers, manure, pesticides and biological control agents, including by ground and aerial spraying;

(e) conducting any other agricultural activity on, in or over agricultural land;

and includes

(f) intensively cultivating in plantations, any

(i) specialty wood crops, or

(ii) specialty fibre crops

prescribed by the minister;
(g) conducting turf production

   (i) outside of an agricultural land reserve, or

   (ii) in an agricultural land reserve with the approval under the Agricultural Land Commission Act of the Provincial Agricultural Land Commission;

(h) aquaculture as defined in the Fisheries Act if carried on by a person licensed, under Part 3 of that Act, to carry on the business of aquaculture;

(i) raising or keeping game, within the meaning of the Game Farm Act, by a person licensed to do so under that Act;

(j) raising or keeping fur bearing animals, within the meaning of the Fur Farm Act, by a person licensed to do so under that Act;

(k) processing or direct marketing by a farmer of one or both of

   (i) the products of a farm owned or operated by the farmer, and

   (ii) within limits prescribed by the minister, products not of that farm,

       to the extent that the processing or marketing of those products is conducted on the farmer’s farm;

       but does not include

(l) an activity, other than grazing or hay cutting, if the activity constitutes a forest practice as defined in the Forest and Range Practices Act;

(m) breeding pets or operating a kennel;

(n) growing, producing, raising or keeping exotic animals, except types of exotic animals prescribed by the minister;

“farmer” means the owner or operator of a farm business;

“land use regulation” means an enactment that restricts or prescribes the use to which land or premises may be put or the nature of business or activities that may be conducted on land or premises, but does not include the following:

   (a) a bylaw under the following provisions of the Community Charter:
section 8 (3) (d) [firecrackers, fireworks and explosives];
section 8 (3) (e) [weapons other than firearms];
section 8 (3) (h) [nuisances, disturbances and other situations];
section 8 (3) (k) [animals];
section 8 (5) [firearms];
(b) a bylaw under the following provisions of the Local Government Act:
section 703 [animal control authority];
section 724 [noise control];
section 725 [nuisances and disturbances];
section 728 [fireworks].

"normal farm practice" means a practice that is conducted by a farm business in a manner consistent with
(a) proper and accepted customs and standards as established and followed by similar farm businesses under similar circumstances, and
(b) any standards prescribed by the Lieutenant Governor in Council,
and includes a practice that makes use of innovative technology in a manner consistent with proper advanced farm management practices and with any standards prescribed under paragraph (b).

Part 2 — Right to Farm

Normal farm practices protected

2 (1) If each of the requirements of subsection (2) is fulfilled in relation to a farm operation conducted as part of a farm business,

(a) the farmer is not liable in nuisance to any person for any odour, noise, dust or other disturbance resulting from the farm operation, and
(b) the farmer must not be prevented by injunction or other order of a court from conducting that farm
operation.

(2) The requirements referred to in subsection (1) are that the farm operation must

(a) be conducted in accordance with normal farm practices,

(b) be conducted on, in or over land

(i) that is in an agricultural land reserve,

(ii) on which, under the Local Government Act, farm use is allowed,

(iii) as permitted by a valid and subsisting licence, issued to that person under the Fisheries Act, for aquaculture, or

(iv) that is Crown land designated as a farming area under subsection (2.1), and

(c) not be conducted in contravention of the Health Act, Integrated Pest Management Act, Environmental Management Act, the regulations under those Acts or any land use regulation.

(2.1) The Lieutenant Governor in Council may designate Crown land as a farming area for the purposes of subsection (2) (b) (iv).

(3) The following apply if each of the requirements of subsection (2), except subsection (2) (b) (ii), is fulfilled in relation to a farm operation conducted as part of a farm business:

(a) despite section 260 (3) [bylaw contraventions] of the Community Charter, a farmer does not contravene a bylaw made under the following provisions of the Community Charter only by conducting that farm operation:

   section 8 (3) (d) [firecrackers, fireworks and explosives];

   section 8 (3) (e) [weapons other than firearms];

   section 8 (3) (h) [nuisances, disturbances and other situations];

   section 8 (3) (k) [animals];

   section 8 (5) [firearms];

(b) despite section 267 of the Local Government Act, a farmer does not contravene a bylaw made under the following provisions of the Local Government Act only by conducting that farm operation:
section 703 [animal control authority];
section 724 [noise control];
section 725 [nuisances and disturbances];
section 728 [fireworks];

(c) despite section 274 [actions by municipality] of the Community Charter and section 281 [enforcement by regional district] of the Local Government Act, the farmer must not be prevented by injunction or other order of a court from conducting that farm operation.

Complaints to Farm Practices Board

3 (1) If a person is aggrieved by any odour, noise, dust or other disturbance resulting from a farm operation conducted as part of a farm business, the person may apply in writing to the board for a determination as to whether the odour, noise, dust or other disturbance results from a normal farm practice.

(2) Every application under subsection (1) must

(a) contain a statement of the nature of the complaint, the name and address of the person making the application, the name and address of the farmer and the location of the farm,

(b) be in a form acceptable to the chair of board, and

(c) be accompanied by the fee prescribed by the Lieutenant Governor in Council.

Settlement of complaints

4 In the interest of reaching a settlement of a complaint that is the subject of an application under section 3 (1), the chair of the board, at any time before a panel of the board has decided the application, may inquire into matters relevant to the complaint, and, as part of that inquiry, may

(a) obtain the advice of persons who are knowledgeable about normal farm practices, and

(b) consult with the farmer identified in the application and the complainant.

Establishing panels to hear complaints

5 After receipt of an application that meets the requirements of section 3, the chair of the board, if satisfied that any consultations under section 4 have been terminated without achieving a settlement of the complaint, or that settlement
is unlikely, must

(a) establish a panel of the board to hear the complaint, and

(b) appoint 3 members of the board to the panel.

Hearing of complaints

6 (1) The panel established to hear an application must hold a hearing and must

(a) dismiss the complaint if the panel is of the opinion that the odour, noise, dust or other disturbance results from a normal farm practice, or

(b) order the farmer to cease the practice that causes the odour, noise, dust or other disturbance if it is not a normal farm practice, or to modify the practice in the manner set out in the order, to be consistent with normal farm practice.

(2) The chair of the board, after giving the complainant an opportunity to be heard, may refuse to refer an application to a panel for the purpose of a hearing, or, after a hearing has begun, the panel to which an application has been referred may refuse to continue the hearing or to make a decision if, in the opinion of the chair of the board or the panel, as the case may be,

(a) the subject matter of the application is trivial,

(b) the application is frivolous or vexatious or is not made in good faith, or

(c) the complainant does not have a sufficient personal interest in the subject matter of the application.

(3) The chair of the board must give written reasons for a decision under subsection (2) refusing to refer an application to a panel.

(4) A panel must give written reasons for a decision under subsection (1) or (2).

(5) Written notice of the decision, under this section, of the chair of the board or a panel, accompanied by the written reasons for the decision, must be delivered to the complainant and the farmer affected by the decision.

Conduct of hearings

7 (1) Subject to any regulations under section 12 (2) ©, the board may determine the practices and procedures to be followed for the purposes of hearings required under section 6.
(2) A hearing is open to the public and may be conducted in an informal manner.

(3) The chair of the board or a panel may receive or accept evidence whether or not it would be admissible in a court of law.

(4) If a member of a panel is absent or unable to attend a hearing, the member is disqualified from continuing to participate in the hearing, and the member or members remaining present may exercise and perform all the jurisdiction, powers and duties of the panel.

(5) Despite subsection (2), a panel of the board may exclude the public from a hearing for the purpose of receiving evidence if the panel considers that the desirability of avoiding disclosure of the evidence in order to protect the interest of any person, or to protect the public interest, outweighs the desirability of public disclosure.

Appeal

8 (1) Within 60 days after receiving written notice, in accordance with section 6 (5), of a decision of the chair or a panel of the board made under section 6, the complainant or farmer affected by the decision may appeal the decision to the Supreme Court on a question of law or jurisdiction.

(2) An appeal from a decision of the Supreme Court lies to the Court of Appeal with leave of a justice of the Court of Appeal.

Part 3 — Board

9 [Repealed 2003-7-21.]

Staff

10 (1) and (2) [Repealed 2003-7-22.]

(3) In accordance with any regulations under section 12 (2) (d), the board may engage or retain specialists and consultants that the board, after taking into account the availability of any services that may be provided to the board under subsection (1), considers necessary to carry out the powers and duties of the board, and the board may determine their remuneration.

(4) The Public Service Act does not apply to the engagement, retention or remuneration of specialists and consultants engaged or retained under subsection (3).
Responsibilities of board

11 (1) The board, the chair of the board or a panel of the board may exercise the powers and perform the duties that are conferred or imposed on it by or under this Act.

(2) On the board’s own initiative or at the request of a municipality or regional district, or of a trust council under the Islands Trust Act, the board may study, report on, and make recommendations concerning, any matter related to farm practices.

(3) The board must provide the minister with any information requested by the minister regarding the policies and procedures of the board.

(4) The minister may order the board to study any matter related to farm practices and the board must conduct the study and report its findings and recommendations to the minister.

(5) In carrying out their powers and duties under this Act, the board members have the powers, privileges and protections of a commissioner under sections 12, 15 and 16 of the Inquiry Act.

Part 4 – Regulations

Power to make regulations

12 (1) The Lieutenant Governor in Council may make regulations referred to in section 41 of the Interpretation Act.

(2) Without limiting the generality of subsection (1), the Lieutenant Governor in Council may make regulations as follows:

(a) prescribing fees payable in respect of an application made under section 3;

(b) respecting standards for the purpose of the definition of “normal farm practice”;

(c) governing practices and procedures for

(i) hearings before a panel of the board, and

(ii) inquiries and consultations respecting complaints or other matters before the board, the chair of the board or a panel of the board;

(d) for the purpose of section 10 (3), respecting the engagement or retention of specialists and consultants by the board;

(e) prescribing the number of members that constitutes a quorum at any meeting of the board.
(3) The minister may make regulations prescribing one or more of the following:

(a) specialty wood crops or specialty fibre crops for the purpose of paragraph (f) of the definition of “farm operation”;

(b) limits referred to in paragraph (k) of the definition of “farm operation”;

(c) exceptions for the purpose of paragraph (n) of the definition of “farm operation”.

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Appendix 4: Farming with the Wild Best Management Practices:

The following list was compiled to offer general guidelines and observations about the farming with the wild movement. Rather than attempting to establish a rigid template that landowners could follow to design a wild farm, per se, included below are general principles that can help to frame the broader concept of establishing agricultural systems that are compatible with healthy ecosystems. This may mean rethinking old boundaries, striving to make new connections, and even rethinking some of the very foundations of agriculture and its place in the ecological community. Every farm, and every farming region, will find its own solutions.

1. Farming with the wild is dependent upon place. A wild farm exhibits a sense of beauty and uniqueness of place. On arable lands, farm systems attempt to mimic the surrounding natural systems, such as pasture operations in grasslands and forest-type cropping in forested areas. Marginally productive lands are restored to the wild, with an emphasis on native habitat.

2. Attempts are made to limit long-term negative impacts or tendencies. Through place adapted strategies, measures are taken to limit soil erosion, protect native habitat, and avoid depletion of local resources through excessive watering, overgrazing, or the use of off-farm synthetic inputs. Farm and ranch operations revolve around cycles of activity and rest, with working areas that are frequently rotated and allowed to recover.

3. The presence of wildlife on the farm is encouraged. At their best, farms and ranches function as buffers, corridors, and even key habitat for certain species. By limiting productive areas only to what is necessary, by respecting seasonal nesting and brooding cycles, by optimizing wild habitat, agricultural operations can accommodate resident and migratory wildlife. Outside citizen monitoring groups can provide essential assistance and skills in mapping, observing, and documenting on-farm biodiversity.

4. Farms should be viewed within the broader context of adjoining lands and ultimately connected to the larger landscape. Farms working in isolation may not be enough to restore fully functioning ecosystems. Connecting habitat patches and corridors within farming regions is an essential goal.

5. Agricultural operations should be viewed within the context of pre-settlement conditions. Developing place-appropriate agricultural systems that work with rather than against Nature requires an understanding of native species and local ecosystem processes prior to European settlement and agriculture. Baseline studies, remnants and fragments of native habitat, and other specific linkages can provide invaluable inputs for restoring wild habitats in farming areas.
6. Farming with the wild moves away from an eradication ethic. Rather than attempting to eliminate undesirable species in order to conduct agriculture, landowners work in partnership with native species. Non-lethal controls are favored to prevent predator losses. Native habitat corridors are established to reduce weed pressures or attract pollinators and beneficial insects. Other disturbance regimes, such as flooding or fire, are sometimes incorporated into the agricultural operation.

7. Farming with the wild begins with conservation-minded communities. The most effective and impressive examples of farming with the wild have begun with communities talking together in search of common solutions to common problems. Inclusive meetings, farm tours, and other gatherings lead to the formation of management teams, the establishment of best practices and science-based monitoring procedures, and the commitment to a better quality of life.

8. Farming with the wild represents a leading-edge consciousness. Farming with the wild requires extreme dedication, courage, and altruism. Embracing rather than vilifying endangered species and relinquishing a sense of historical agricultural entitlement represent acts of true leadership in society that require both an open heart and an open mind.

9. Farming with the wild is not static, but a continual work in progress. Restoring wild habitats requires an ongoing interplay between the landscape, farm, and the local community. The reestablishment of native plantings requires an active farming approach at least in the short term, to be adapted and evolved as time passes. A wild farm is engaged in a continual effort to develop ever more profound ways to become “naturalized.”

10. Farming with the wild requires an interdisciplinary approach. Successes at the farming region level will require the collaboration between sustainable agriculture practitioners, conservation biologists, restorationists, and others. Research and on-the-ground models are urgently needed to explore the values and possibilities for integrating wild habitats in production areas.

11. Consumers and citizens have key roles to play in determining the food system. Our food choices reflect our values and directly impact our visions and expectations for agriculture and the land. Everyday purchases can be used to bring land stewardship issues to the home, restaurant, workplace, and conference center. This can include supporting producers for protecting biodiversity as well as actively avoiding products that threaten native species or habitat. Voting power, particularly toward influencing the outcome of Farm Bill conservation and agricultural subsidy policies, has a critical bearing on private land use in the United States.

12. We have the resources to leave a legacy of conservation-based agriculture. There are many viable alternatives to the present model of industrial monoculture which dominates world food and fiber production at increasing costs.
to the natural world. While it will not be easy in any way, and this occurs at a time when many farmers, ranchers,
and others are struggling to survive economically in rural communities, we still have the chance to devote the
resources and establish the systems necessary to develop an agriculture that is compatible with wild Nature.
Our future, and the future of biodiversity, depends on our ability to fundamentally change the way we perceive
agriculture and its place in the ecological community.

Excerpted from *Farming with the Wild: Enhancing Biodiversity on Farms and Ranches*, by Daniel Imhoff, A Watershed
Media Book published by Sierra Club Books
Appendix 5: Agricultural Production & Residential Density

<table>
<thead>
<tr>
<th>Farm scale (acres)</th>
<th>Income (gross) per acre</th>
<th>Production (# d.u./acre)*</th>
<th>Farm income</th>
<th>Total d.u. supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td>$40,000</td>
<td>25</td>
<td>$6,800,000</td>
<td>4250</td>
</tr>
</tbody>
</table>

* assuming production during growing season/25 families per acre

<table>
<thead>
<tr>
<th>Lot size</th>
<th>Lots per block</th>
<th>Block size</th>
<th>Sq. ft. per acre</th>
<th>Block acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4000</td>
<td>24</td>
<td>96000</td>
<td>43560</td>
<td>2.203856749</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block size (acres)</th>
<th># Blocks</th>
<th>Density type</th>
<th>Density (d.u./acre)</th>
<th>d.u.</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>14.5</td>
<td>s.f.d.</td>
<td>20</td>
<td>638</td>
<td>1595</td>
</tr>
<tr>
<td>2.2</td>
<td>17</td>
<td>m.d.g.o.</td>
<td>30</td>
<td>1122</td>
<td>2805</td>
</tr>
<tr>
<td>2.2</td>
<td>0.5</td>
<td>h.d.l.r.</td>
<td>80</td>
<td>88</td>
<td>220</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32</strong></td>
<td></td>
<td></td>
<td><strong>1848</strong></td>
<td><strong>4620</strong></td>
</tr>
</tbody>
</table>
Appendix 6: Irrigation and Detention Storage Requirements

**Irrigation Requirements**

<table>
<thead>
<tr>
<th>Rooting depth (m)</th>
<th>Available water storage capacity (AWSC) (mm/m)</th>
<th>Availability coefficient (%)</th>
<th>Maximum soil water deficit (mm)</th>
<th>Average seasonal irrigation requirement (mm)</th>
<th>Application efficiency (%)</th>
<th>Irrigation requirement (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45</td>
<td>175</td>
<td>40</td>
<td>31.5</td>
<td>210</td>
<td>95</td>
<td>221.0526316</td>
</tr>
</tbody>
</table>

Normal irrigation period (days) 140

*Calculations do not take into account leaching requirements (to control soil salinization) based on electrical conductivity of irrigation water.

Storage required per hectare plot (cu.m.) = \(2 \times 10,000 \times 0.221\)

\[ \text{4420 cu.m} \]

\[ 156091 	ext{ cu ft} \]

\[ 3.5833629 	ext{ ac ft} \]

\[ 0.597226048 	ext{ surface area (acres) @ 6ft. Avg depth... per hectare of productive land} \]

**Can Bio Resources report:** water deficit for Spetifore lands during growing season (i.e. irrigation requirement)

<table>
<thead>
<tr>
<th>Gallons H2O</th>
<th>gallons per acre-foot</th>
<th>acre-feet H2O</th>
<th>cubic meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>51,000,000</td>
<td>325851.43</td>
<td>156,513,0465</td>
<td>200000</td>
</tr>
</tbody>
</table>

**Irrigation pond requirements**

- Number ponds: 8
- Average depth (based on parabolic bottom profile): 2
- Surface area required (m2): 5525

8 irrigation ponds @ approx. 2 acres each.

*Calculations based on the Guide to Irrigation System Design with Reclaimed Water information factsheet provided by the BC Ministry of Agriculture Food & Fisheries (order no. 595.00-1, February 2001 - Agdex: 753)