A LANDSCAPE ARCHITECTURAL APPROACH TO URBAN AGRICULTURE
AND CONTINUOUS LANDSCAPES

A CREATIVE PROJECT SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF LANDSCAPE ARCHITECTURE

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Streets, guns, machines, 
quicker fortunes, quicker deaths, 
bear down...

...Here
where the time of rain is kept
take what is half ruined
and make it clear, put it
back in mind

--Wendell Berry
from The Clearing

...to forget how to dig the earth and tend the soil is to forget ourselves.

--Gandhi
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Part One: Introduction

The concept of “local” food is an increasingly popular one, particularly in urban areas where farming is traditionally a distant concern. At its core, the idea of acquiring one’s food from local sources capitalizes on the desire, more keenly felt today perhaps than anytime in the recent past, for our lives to be more closely bound to the natural processes on which they depend. To support this assertion, Bill McKibben notes that farmer’s markets have rapidly increased in number in the last 10-15 years, nearly doubling in number in the years between 1994 and 2002.¹ There is a sense of security in knowing how the food is grown, and maybe even in knowing the grower.

Any ambivalence about this process arises from an increasing awareness of how food has typically been grown since the rise of industrial agriculture in the middle of the 20th Century. The concerns here range from the environmental and human health risks posed by industrial farming’s dependence on chemical inputs, to the relationship between oil, farming and global warming, to more recent issues concerning genetically modified crops and livestock. This picture is further complicated by the affect the business of industrial farming has had on local populations around the world. In the United States, for instance, contemporary farming practice and policy—largely dictated by the

agribusiness sector—has decimated a once-robust population of farmers by pushing for larger farms with fewer operators (even the U.S. Census Bureau, as of 1993, quit tracking this population). The history of this transformation is well documented. In *Raise Less Corn and More Hell*, there is even the suggestion that the effort to reduce the farming population is a deliberate attempt to limit the political power wielded by a nation’s land owners and food producers. Whatever the motivation, the trend threatens with extinction a once commonly held knowledge of how to work the soil, the cycles of growth and rest, and it speaks to the increasing distance between farmer and market—a distance that people are beginning to notice. We can even put a number to this distance: an average pound of food in the United States travels about 1500 miles to reach a plate.\(^2\)

The situation is the same wherever industrial agriculture has become the norm, including population centers such as China and India. The result is that by 2030 some 2/3 of the world’s population will live in cities.\(^3\) Already in the United States, 80% of the population lives in cities.\(^4\) These numbers hint at the enormous burden placed on food transport, supply networks and production capacity. The only answer available to industrial agriculture is more of the same: more chemical inputs, more soil loss, more land under common owner and more farmers forced into the city in search of employment.

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\(^3\) [UN Secretary-General SG/SM/11903 HAB/211](http://www.un.org/News/Press/docs/2008/sgsm11903.doc.htm) (accessed 11.22.08)

Urban agriculture, then, affords a unique opportunity to address many of the challenges posed by today’s agricultural dilemmas: the transportation of food to population centers, food quality and nutritional content, soil health, and a renewed awareness of the cyclical processes that provide us our daily bread, so to speak.

Urban agriculture (UA) is more than community gardening, though this sort of activity is a valid and important part of community food production. But urban agriculture focuses on a greater level of production and, often, a wider variety of crops, including fish and livestock. Urban agriculture succeeds where industrial agriculture fails precisely because of this issue of scale: while it is larger and more productive than a community garden, it is smaller than an industrial farm and thus able to practice a sustainable approach to farming.

The concept of “sustainable” agriculture is a large and complex one—there is more than one institute dedicated to research into this controversial subject. The scale at which UA is often practiced allows for the building and regeneration of soil health, creating effective carbon sinks and often eliminating the need for chemical inputs; it increases the efficiency of resource use, notably water and manure; it allows for crops to be selected for their taste and nutritional quality, as opposed to the industrial system’s preference for shelf life; it sharply reduces or eliminates the transportation burden required when food is grown far from population centers; it puts the whole of a community’s food dollars in the farmer’s pocket, which means it is re-circulated within the community rather than being siphoned off to agribusiness coffers. And, importantly, UA allows urban communities to witness and experience the nature of food production—
the seasons, the birth and death, the work and the payoff. In an era that has spawned terms like “nature deficit disorder”, this service seems immeasurably valuable and timely.

This project proposes a design for an urban farm—the Back in Mind Urban Farm—that addresses the environmental and social challenges posed by industrial agriculture and growing urban populations. As such, it asks how an urban farm can function according to integrated, closed-loop principles; it addresses the manner in which the farm can integrate itself with the economic structure of the city; and it creates social opportunities where potential and possibility are most diminished. More, the Back in Mind Urban Farm occupies a variety of urban edges—between neighborhoods and industrial businesses, between highways, rail lines and a stream, between affluence and poverty, etc—and acts as a mediator between these disparate landscapes. In this capacity its role has four parts:

1. To provide equitable access to healthy food
2. To change the character of a largely residential area whose core is currently occupied by light industrial activities
3. To provide a new experience of natural processes in the city
4. To create the framework for a CPUL, or Continuous Productive Urban Landscape. This concept is described more fully below; it may be enough to say now that the farm will help reorient urban transportation toward greener and more pedestrian friendly networks that simultaneously support a productive element.

This project attempts to suggest how the city can adapt to challenges perceived and anticipated. It is not intended that the whole of the design be taken as a one-fell-swoop approach to managing a transition toward a greater reliance on urban food production. It
is, however, intended as a guide to understanding how urban farming can 1) stand as a contrast to the threats of industrial agriculture and 2) provide a greener and more equitable range of urban experiences.

A final note on this proposal’s chosen name for the farm: the phrase “back in mind” is drawn from *The Clearing*, a poem by Wendell Berry. The line and the poem both speak to the core of this project, which is an effort to bring individuals and communities back to the land and a knowledge of the processes whence food is acquired. More, it is an effort to bring deteriorating, maybe even forgotten, communities back into the public consciousness. While avoiding any utopian optimism, it is hoped that this project could provide equity and opportunity on an issue of basic human right—access to healthy food. That said, this project is intended to grow from local efforts, and this goal is written into the organizational structure of the enterprise and the outreach and employment programs available to the community. Therefore, it seems appropriate that the author’s name for the farm be a provisional one and that the farm’s future operators, workers and supporters decide for themselves what name aptly sums their collective hopes and aspirations.

**Research Problem**

This proposal examined the design parameters for an integrated, closed-loop farming operation in an intensely urban context in Indianapolis, IN. Additionally, the project attempted to position an urban farm such that it becomes an asset to a community suffering from a dearth of opportunities. This aspect of the project examined the physical
relationship of an urban farm to the community in which it is located, as well as the potential for it to create social opportunities, such as training and employment.

The following questions detail the range of issues that were considered in this thesis.

1. How are integrated, closed-loop farming practices applied in an urban context?

   1.1 What constitutes an integrated, closed-loop farm?

      1.1.1 What are relevant permaculture principles?

      1.1.2 What are relevant ZERI system principles?

      1.1.3 What elements require treatment: stormwater, energy, waste streams, product line (algae, fish, mushrooms, eggs, crops, etc.)

      1.1.4 What are the space requirements?

      1.1.5 What role does livestock play?

   1.2 What is the governing structure of an integrated farm? Note: if an integrated farm implies that the various parts—productive and otherwise—of the farm interact and rely on each other, then it likely follows that to be successfully integrated the farm cannot be variously worked or at risk of inconsistent management. This implies that a community garden format—one in which individual plots are leased or rented—is not appropriate for the proposed operation.

      1.2.1 How does an integrated farm differ from a community or allotment garden in management structure?

      1.2.2 Who owns the land? Is it private, public, or a combination?

      1.2.3 Who performs and/or manages the work?
1.2.4 How does the farm achieve some level of commercial viability? Does the site act as market as well as farm? Does it maintain contractual obligations with area restaurants and/or individual consumers?

2 What characteristics of the urban environment promote or are impacted by UA?

2.1 What other sites can connect to/build off of/be improved upon by an integrated urban farm?

2.1.4 open space, parks

2.1.5 pedestrian connections

2.1.6 public plazas

2.1.7 neighborhoods

2.1.8 schools

2.1.9 vicinity prison

2.1.10 streets and alleys

2.2 How is the site protected from the threats inherent in an urban environment?

2.2.4 Pollution: noise, air, light, water, soil

2.2.5 Runoff issues

2.3 How can the site improve the urban environment?

2.3.4 Stormwater management; can this be captured and used for irrigation?

2.3.5 Urban forestry: how is this used in conjunction with the permaculture practice of edible forestry?

2.3.6 Viewshed and aesthetics

2.3.7 Walkability, physical connections

2.3.8 Wildlife habitat
2.4 What are the social benefits to such a venture?

2.4.1 What jobs are available: growers, packagers, marketers, sellers, bookkeepers, manager/steward

2.4.2 Are there opportunities for educational programs, job training, outreach to schools, prison population?

2.4.3 How can the site produce for poor and wealthy communities alike? Can the site be located in and/or connected to both?

2.4.4 How does the project reverse processes of urban decay?

Delimitations

1. This project does not investigate the social or political barriers to urban agriculture.

2. This project does not discuss the economic implications of its proposals beyond an effort to describe financially successful precedents. This project will not address land value and the relative costs/benefits of converting land to UA and other CPUL functions.

3. This project does not address the complex relationships between food production levels and the nutritional requirements of any given population.

4. This project does not belabor the issues surrounding industrial agriculture: pollution and environmental degradation, food security, peak oil, etc. However, some background should be provided.

5. This project does not address the relationship between zoning regulations and the proposed activities.
Assumptions

1. It is a small leap to imagine a situation where urban areas will be responsible for providing some amount of their own food. Therefore, it has been assumed that either necessity, community demand or a combination of both will create the social and political environment to support the proposals contained in the project.

2. This project was properly vetted before it is implemented in part or whole.

3. Land use patterns change over time. It has been assumed that parcels used to create a continuous productive landscape are better envisioned in this capacity than in whatever function they previously served. Similarly, it is assumed that greater value is placed on the sort of “green network” proposed in this project than is presently evident in the city of Indianapolis.

4. The soil character of a properly functioning agriculture operation takes considerable time and preparation before it is considered a viable component of the system. This project assumed that site’s soil is adequately prepared prior to the implementation of the proposals.

5. Farming is not ruled by formula. That is, a farm must be able to adapt to changing conditions, which may include environmental factors, changes in the market, pest problems, soil issues, etc. It was assumed, then, that the farm is adequately managed, and this design proposal will not determine absolutely the selection and layout of crops.
Definition of Terms

1. Continuous Productive Urban Landscapes (CPULs) are defined by the following characteristics: they are coherently planned and designed and spatially continuous, meaning they are uninterrupted as they traverse the wider urban landscape; they include open urban space; they are productive in economical, social and environmental terms; they are constructed to incorporate living and natural elements; they are designed to allow urban dwellers to reconnect with processes required to sustain life; they are marked by car-free, walk-able, bike-able landscapes running through the entire city; importantly, they are not yet in existence.

2. Urban agriculture (UA): urban agriculture involves growing plants and raising animals for food and other uses in and around towns; UA is practiced at a variety of scales, from window box herb gardens to commercial enterprises. Related activities include the production and delivery of inputs (compost, seed, etc.) and processing and marketing of goods. UA is a major feature in developing countries, where it is crucial to filling the dietary needs of urban populations. In the developed world—Europe, North America, Japan, etc.—UA is typically limited to community gardens, though this is quickly changing. Either way, many of these UA enterprises serve disadvantaged communities.
3. Industrial agriculture is characterized by the following attributes: a greatly expanded operation size; an increase in chemical inputs for a range of purposes; the replacement of labor with technology; increased cost accounting; a stress on uniformity and a narrow genetic base for crops and livestock; and a decrease in number of owner-managers.\(^5\)

4. Alternative agriculture: this refers to farm operations that differ significantly in character and practice from the industrial production model. Most often this involves a reduction in the operation’s scale and subsequent reliance on chemical inputs. “Organic” farming is a term often used in this context, though the term most often implies just the absence of chemical inputs. Scale, waste and integration, in other words, are not necessarily addressed.

5. Clean food: clean food is often the product of alternative agriculture; the term describes food—fruit, vegetable and animal—produced organically and without the need for chemical inputs. The term is increasingly applied to locally produced food and food that is produced at a smaller scale than possible with industrial and some “organic” production models.

6. Closed-loop: this refers to systems that produce no waste. Typically this means that waste produced by one process is used as feed for a subsequent process, and

this pattern repeats in a cyclical manner. Often these processes produce goods in addition to those produced by conventional growing methods.

7. Zero Emissions Research and Initiatives (ZERI): this is an international group of systems designers concerned with the creation and construction of closed-loop systems in a variety of applications, from farm operations to building systems. The ZERI farming system encountered most frequently is the Integrated Farming and Waste Management System created by George Chan.

8. Permaculture is a term that describes a type of intentional characterized by an integrated agriculture system that behaves much like natural ecological systems. Permaculture communities combine “architecture with biology, agriculture with forestry, and forestry with animal husbandry” (Mollison 1991, vii).

Conclusion

This project provides the Near Eastside of Indianapolis with a plan for an urban farm that will provide a significant local food source, a range of community training and employment assets, and a new vision for the neighborhood. To accomplish these goals, the farm will operate without waste streams and in manner that builds soil and ecological health, and the site as a whole will create new physical connections and uses so as to offer a vibrant destination for community activity.
The following section reviews the precedents and components for this type of project. These include no-waste farming systems and the sort of amenities that will define how the site is eventually used and incorporated into the fabric of everyday life for Near Eastside residents—and even those outside this district.
Part Two: Precedents for Integrated Urban Agriculture

This project capitalized on the successful examples of existing projects at a time when many American communities are beginning to understand the range of issues involved in their food choices. And it comes at a time when locally-focused projects like this one are often the preferred vehicle for improving conditions in struggling urban communities.

Integrated agriculture has many faces, and these are briefly reviewed below, along with a discussion of the current state of urban farming, both in the U.S. and abroad. The intersections of this material with the goals of this project are described in the site features developed for the farm.

Urban Farms in the U.S. and Globally

It is important to review current approaches to urban agriculture (UA) in order to determine in what ways this project will resemble or differ from established models. This is a widely researched subject with an abundance of commentators—from the organizational level (Resource Centers on Urban Agriculture and Food Security [RUAF]) to the work of individual designers (for example, André Viljoen). In developing countries, the focus is primarily on resources and food security; in developed countries, which are coming (back) around to UA more recently, the discussion tends to focus on scale and type.
UA is typically the result of crisis, as was the case with England’s wartime Victory Gardens. Most UA efforts today are found in developing countries, where crisis is often a basic fact of life. As Mougeot notes, the two major forces guiding the development of UA in times of crisis are the duel needs for a reliable food source and a secure financial base. Secondary benefits include reduced child mortality, improved maternal health and environmental sustainability.\(^1\) He also noted that these enterprises are characterized by ingenuity and opportunistic efforts. There is little debate about these aspects of UA (see SIDA 2001, Viljoen 2005, van Veenhuizen, ed. 2006), and they are relevant to this study in order to illustrate the concomitant challenges and opportunities faced by the communities in Indianapolis which are potentially threatened by similar conditions.

Present UA efforts, particularly those in developing countries, are also characterized by a conservative use of limited resources. For instance, urban wastewater (that conveying human waste as well as stormwater) is often used to irrigate UA crops. While this practice is crucial to the operations’ viability, it also poses a significant health risk. Parasites, cholera, typhoid, and bacterial diseases (e. coli, for instance), heavy metals and pharmaceuticals are the primary concerns; more, wastewater taken from municipal treatment plants is often contaminated with chemical pollutants. But the benefits to these communities are hard to ignore: crops irrigated with wastewater often do not require additional fertilizers, which are often a financial burden, and production rates are higher. Furthermore, access to wastewater is a relatively simple matter and locates the farm near urban market places, obviating the need for storage and transportation. All of this translates into more money for the farmer.

Additionally, many UA operations utilize human solid waste and other household organic matter in the place of more conventional—and expensive—fertilizers, which pose additional challenges to growing food in urban areas.

There are significant precedents for waste recycling—composting—in UA enterprises in developed countries, as well, though with less reliance on human solid waste. Indeed, composting is a staple of the typical community garden, which is the preferred format for UA in developed countries. Composting is a key element of larger urban farms, as well, and may include additional methods like vermiculture (the use of worms to aid the breakdown of organic material and contribute substantial nutrients in turn). Increasingly, communities are making a coordinated effort to gather organic material for composting (see, for example, the Community Compost Network, http://www.communitycompost.org). The Sustainable Agriculture Research and Education program, supported by the U.S. Dept. of Agriculture, has funded studies to examine the potential for another sort of waste recycling on a larger scale in a rural context. The system, which utilizes a bio-digester to convert food waste into methane and compostable biosolids, is similar to the one created by ZERI integrated farm designers. This project examined the potential application of this type of system in an urban context in order to capitalize on the conservative approach to resource use seen in developing countries while also proving safe production practices.

Urban farms today are increasing in number across the United States. Most of these are the products of individual investments, such as the ¾ acre Greensgrow Farm in Philadelphia, PA and the 2 acre Growing Power in Milwaukee. Other UA projects, however,

are beginning to receive public financial support. Braddock Farms (1/2 acre) in Braddock, PA, for example, is part of the Grow Pittsburgh UA network and supported by a number of private and public entities. Each of these farms are discussed further as case studies.

The organization of UA enterprises in developed countries is another area receiving significant attention today. The City of Vancouver, British Columbia, and the Southeast False Creek (SEFC) area produced a large planning document that represents perhaps the most robust and innovative approach to a widespread UA program in developed countries (Southeast False Creek Urban Agriculture Strategy, 2002). In addition to the multi-tiered support of the Vancouver city government (as regulator, investor/entrepreneur/promoter and/or program facilitator/manager), the plan details the recruitment of area universities and private developers to support the project and calls on non-governmental organizations to facilitate the actual farms. The plan goes on to recommend implementation measures that include regulatory tools and partnership options which demonstrate how an urban community can make a significant commitment to UA. What is unique about this plan is its consideration of a variety of platforms for growing food: from roofs and window boxes to park and school grounds, inside buildings, with greenhouses, and including aquaculture and livestock. This is a thorough and robust effort to bring food production into the city. More locally, Indianapolis hosted an Urban Farming Forum in February 2009, bringing together interests as diverse as the city brownfields coordinator and an IUPUI medical researcher. The event was well-attended, and it illuminated the exploding interest in this topic.

In Introduction to Permaculture, Bill Mollison contends that city farms can be organized and managed along several different lines according to their size and character. So, for instance, a larger-scale city farm might require “100 or more families” form an
association and acquire a legally-binding lease, as well as a paid management team; conversely, traditional community gardens require less formal support beyond that which is provided by the city where land availability is concerned. The SEFC plan similarly discusses a range of governance alternatives, but in each case the recommended organization/management structure follows both the typical size of the given operation as well as lessons gathered from case studies, which are provided in the plan.

Finally, it is important to note the range of financial relationships that sustain urban farms. These include farmer’s markets, food coops, contractual relationships with restaurants or groceries, grants, donations, educational workshops and more. A growing trend in American UA is CSA, or community-supported agriculture. In this arrangement, consumers subscribe to a farm and in return for their regular fee receive a given amount of the farm’s produce. It is typical for a farm to maintain a mix of these practices, but, regardless, it is increasingly acknowledged that a vibrant urban farm maintain a commercial profile.

**Regional Considerations: Farming and Food in Indiana**

Indiana is a major agricultural producer with sales exceeding $4 billion according to the 2002 Census of Agriculture; by 2006 farm receipts totaled $5.7 billion. The largest commodities are corn, soybeans and hogs. And while the current administration has made some indication of creating supports for crop diversification and organic farming, there is virtually no chance that the income from the commodities listed above—all gained through industrial methods—will be sacrificed. Indeed, as the Indiana State Department of

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Agriculture strategic plan makes clear, these activities will be increased in an effort to grow this segment of the state’s economy.4

With this picture of Indiana’s agricultural future, the significance of this project becomes clearer. If Hoosier communities are to combat the destructive trends inherent to industrial agriculture, then urban agriculture must become a priority for land use in the city.

**Integrated and Alternative Farming Systems & Operations**

The term ‘integrated farming’ carries a number of associations and definitions. The French organization, FARRE (Forum de l'Agriculture Raisonnée Respectueuse l'Environnement), claimed the term to describe its “attempt to reconcile agricultural methods with the principles of sustainable development.”5 George Chan’s Integrated Farming and Waste Management System (IF&WMS) is another use of the term. Chan is a Zero Emissions Research and Initiatives (ZERI) system designer; the IF&WMS is a type of farming operation that combines livestock, bio-digesters, aquaculture and other components to create a closed-loop, no waste system. Permaculture involves a deeply integrated approach to agriculture, and “organic” agriculture practitioners also employ the term to describe their attempts to make wise use of resources. This project draws from each of these and proposes an urban farm that will act as an asset to urban ecology and contribute to the building of soil and community alike.

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What is “Organic”

The term “organic” is certainly overused today. Indeed, Joel Salatin, the rotational grazing guru made famous by Michael Pollan’s 2006 book, *Omnivore’s Dilemma*, considers his farm, Polyface Farm, “beyond organic,” and has written extensively about the many ways a certified organic product can be compromised due to regulatory failures or even the very processes that guide an operation. Pollan himself spends a number of pages discussing the triumph of marketing in passing organic food off as more than it is—a palliative idea as much as (or more than) a healthy reality. So what does “organic” mean?

The use of the word “organic” to describe a particular method of gardening and farming began in the 1960’s. Conceptually, organic agriculture implies a few basic ideas: 1) that the manner in which soil is worked restores and builds soil health without the use of synthetic fertilizers, herbicides and pesticides; 2) the farm operation emphasizes biodiversity and ecological health; and 3) the operation focuses on resource conservation and renewable resources. Today, the USDA regulates the certification of organic farming. The Organic Foods Production Act (OFPA), enacted under Title 21 of the 1990 Farm Bill, created the USDA National Organic Standards Board (NOSB), which defines organic agriculture as follows:

- “Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.
- “‘Organic’ is a labeling term that denotes products produced under the authority of the Organic Foods Production Act. The principal guidelines for organic production
are to use materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole.

- “Organic agriculture practices cannot ensure that products are completely free of residues; however, methods are used to minimize pollution from air, soil and water.
- “Organic food handlers, processors and retailers adhere to standards that maintain the integrity of organic agricultural products. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people.”

Many farmers, like Salatin, have noted that government regulation has corrupted the rigor of organic farming in order to broaden the market in organics and allow industrial producers to participate without adhering to the stricter principles under which the organic movement first took shape. For example, it is possible to buy an organic chicken that has never stepped outside of the barn it shares with thousands of other chickens. Salatin, on the other hand, offers chickens that express their “physiological distinctiveness” in rich pastures. They aren’t, however, organic according to USDA regulations.

With this in mind, I avoided using the term. It was certainly the aim of this project to produce “organic” food—that is, food that is free of synthetic chemicals grown in a manner that restores and builds soil health. But this is quite likely the necessary consequence of having designed a no-waste, closed-loop farm.

**Permaculture**

Permaculture principles provided an effective guide to this process. Typically these principles are applied to the organization of an intentional community—one that is planned

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according to a group’s shared values—that includes an agricultural dimension. While this project acknowledges the value of such communities, the effort here was to consider these principles in the design of a UA project that serves existing communities.

Many permaculture sources describe 12 principles that characterize a community designed to sustain itself indefinitely (permanent culture). In general these principles pertain to scale, flexibility, observation and pattern recognition, energy use, the efficacy of natural systems and their use as models, and the integrated and complementary functions of system components. Soil is a key element to a permaculture system. David Holmgren and Bill Mollison, two of the creators of the permaculture system, emphasize the critical role soil plays, particularly in its capacity to sequester CO₂ and the long-term effect of various composting practices on this process as well as long-term fertility. In this regard, long-term system succession, where the function of any given plot of land is allowed to adapt and change functions in response to environmental conditions, is vital to ensure the future viability of the soil. To be successful in this system, practitioners must remain flexible and exercise their imagination. For this reason, a permaculture farm must be consistently managed and knowledge of the area’s trends and processes must be maintained in the community.

A final word on permaculture and this project: unlike most human endeavors, permaculture demands that people react to natural phenomena rather than attempt to dominate them. Any successful design will have to allow for natural processes, both in the long and short term, and, more, find in them the next opportunity. Holmgren states it thus:
“the problem is the solution.”

This was perhaps the great design challenge of this project, particularly where flexibility in land use is limited.

ZERI

The Zero Emissions Research and Initiatives organization gave rise to the Integrated Farming and Waste Management System. Both are concerned with no waste, practical, affordable solutions to many of the world’s challenges. The ZERI system differs from permaculture operations in a few notable ways. First, ZERI systems as a matter of practice intentionally utilize all five kingdoms of nature—plant, animal, bacteria, fungi and algae. That is to say, each kingdom is directly harnessed to accomplish a specific task, namely in removing wastes and toxins from other kingdom’s species. According to Brandon Pitcher, a ZERI representative in Indiana, permaculture operations are not so explicit with their designs, though each of the kingdoms may nevertheless be present on a farm in some manner. Second, the ZERI systems place less emphasis on adaptability or the sort of experimentation, risk and uncertainty described in permaculture principles. Indeed, the IF&WMS creator, George Chan, speaks of the potential for the ZERI system to near perfection, an idea which seems entirely antithetical to the way permaculture embraces ambiguity. Third, and following the second point, the IF&WMS is rather prescriptive. Simply stated, ZERI is a system while permaculture is a set of guiding principles.

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9 Pitcher, Brandon. Comments made at the Focus the Nation conference, January 31, 2008
This does not, of course, devalue the contribution of IF&WMS to integrated farming enterprises. Indeed, the success of these systems in places like Fiji, Namibia and Brazil has been translated to first world locations. Pitcher is involved with a range of projects in Indiana, including attempts to create ZERI-style breweries and closed-loop industrial scale hog farms.\footnote{Ibid.}

The potential applications to this project include the standard IF&WMS components introduced by George Chan: livestock, aquaculture (a topic discussed in a number of sources, including the Southeast False Creek Urban Agriculture Strategy), algae, mushrooms and the production via biodigester of methane gas to power site features.

How these elements provide food streams for one another in a manner that eliminates waste production is illustrated in Fig. 1. In addition to the elimination of waste, the ZERI system creates supplementary income streams. For example, a standard hog farm might sell

\[\text{Figure 1: Sample ZERI system; image from http://en.wikipedia.org/wiki/Zero_waste_agriculture}\]
just one thing: hogs. A ZERI farm, on the other hand, sells hogs, fish and mushrooms, and it harnesses the hogs’ waste to produce energy used on the farm.

Permaculture and ZERI approaches to farming might be said to differ on one dominate point: scale. Where permaculture advises any project to remain at a level that emphasizes the human scale, ZERI is comfortable acting within economies of scale, which emphasize the economic efficiency—and little else—gained by larger, monotypic operations. Of course, ZERI diversifies these operations, but there is little net effect on the scale of industry and its overall influence on culture and society. In his Introduction to Permaculture, Bill Mollison muses on the subject this way: “Perhaps we should control only those areas we can establish, maintain and harvest by small technologies as a form of control on our appetites”.\(^{12}\) Again, it was the task of this project to find a balance within these concepts that is appropriate for this site.

**The Grow Biointensive® Method**

Stepping aside from integrated systems for a moment, the Grow Biointensive® method of crop production addresses this one aspect of a farm’s activity. John Jeavons helped develop this method from older methods of intensive agriculture practiced in Europe and elsewhere in the 19\(^{th}\) and early 20\(^{th}\) Centuries.

Grow Biointensive® chiefly addresses soil health, which in turn influences crop health and yield. Jeavon’s notes that even conventional organic agriculture depletes soil faster than nature can build it; industrial agriculture is obviously much more dangerous in this regard. The net result, of course, is loss of arable land to feed a growing world

population. Grow Biointensive®, conversely, builds soil, including a 100% increase in soil fertility, a 200% to 400% increase in caloric production per unit of area, and up to an 88% reduction in water consumption per unit of production.\textsuperscript{13}

In short, the method consists of creating raised beds that simulate the prime growing conditions ancient Greeks noticed among plants colonizing landslides. This type of raised bed, 3’-6’ wide, maximizes temperature and moisture stability. It also promotes the most vigorous root growth, increases access to soil nutrients and prevents erosion. This stands in stark contrast to conventional row cropping. The method relies heavily on good composting practices, close plant spacing and synergistic crop combinations. This last feature is sometimes called ‘intercropping’, which uses crops, herbs and ornamental plants to support one another—typically in a nutrient-sharing relationship or to attract and sustain beneficial predator insects to keep crops clear of pests and disease.

Jeavons is careful to note that the Grow Biointensive® method can be abused and deplete soil as efficiently as it can build it when practiced properly. To avoid this, he urges the Grow Biointensive® method to be practiced in concert with other farming techniques. In this project, biointensive farming is one part of larger system. The details of this larger system are addressed below.

More importantly, Jeavons insists that the focus of the Grow Biointensive® method is to enable individuals to meet their own needs. This is a small-scale solution intended to confront larger challenges effectively. As such, it is a perfect match for this project and its goal of empowering disadvantaged communities.

Vermiculture-Aquaculture-Hydroponics-Mushrooms

The combination of vermiculture, aquaculture and hydroponics is one portion of the larger system alluded to above. It involves processing wastes into castings (or compost) with specialized worms, the farming of edible fish in indoor tanks, and raising ornamental and edible plants through filtration beds at the end of this line. This can be—and is—practiced at a large scale, but keeping in line with the scale which interests this project demands that it is practiced on the Back in Mind Urban Farm according to a different set of values. One distinction to note is that an integrated system does not seek a monoculture. In other words, this system harvests a range of fish—tilapia, perch, trout, even bait fish—so that each species fills a different niche in the chain of consumption.

The system works harmoniously. First, wastes are collected—even from area restaurants—and fed to the vermiculture worms. Once this waste is rendered into a rich compost, it is fed to the fish. The tanks continuously recirculate water, so as each tank’s water is fouled by the fish, it moves to beds where potted herbs, lettuces, and ornamental plants are potted in compost-rich pots. These pots are periodically flushed with the nutrient-rich waste water from the fish tanks. From here, the water enters long, slightly sloped and shallow beds of watercress, which fully cleans the water before it reenters the beginning of the system. The watercress, a nutritious leafy vegetable, is periodically harvested and sold. Solids dredged from the fish tanks are also fed back into the vermiculture bins. This is an extremely productive system from which a variety of products are harvested and which produces no waste—and in fact consumes waste from outside sources.

Mushroom cultivation adds another element to the system. This operation is largely separate from the system described above. It requires space for sanitizing equipment and
inoculating trays on which mushrooms are grown, and the actual growing space is shaded. The trays are layered with a growing substrate which may contain materials such as wheat straw bedding containing horse manure, hay, corn cobs, cottonseed hulls, poultry manure, brewer's grain, cottonseed meal, cocoa bean hulls and gypsum (again, using waste materials). Ground soybeans or seed meal supplements are often added later in the production cycle. The top layer of the substrate is a "casing" layer, which is a mixture of peat moss and ground limestone, which provides support for the growing mushrooms. Once the mushrooms are harvested, the substrate is considered “spent”. Spent substrate from the operation is fed back into the vermiculture bins, where it is converted into a valuable nutrition source for the fish. Because spent substrate is high in organic content, it is fed to livestock or used directly on crops.

**Landscape Components: CPULs (Continuous Productive Urban Landscapes)**

The concept of continuous landscapes is part of Viljoen’s *CPULs: Continuous Productive Urban Landscapes*. This text discusses the combination of productive urban land (UA) with other open space land uses. The overarching goal is to create interconnected, vegetated, productive urban landscapes that ultimately connect one end of a city to the other. The focus of such a concept follows much of what has already been discussed here, at least in terms of productivity. The major addition to the topic is the simultaneous planning of UA and flexible, park/plaza-type spaces that gain their definition through a variety of cultural
occupation. It is the hope of this text that such simultaneous and spontaneous use will make these types of productive areas an indelible part of the urban landscape.

In many ways, Viljoen’s ideas are akin to more broadly expressed notions of greenways (e.g. rails-to-trails), urban wildlife corridors, and community walkability. The benefits to such features run the gamut from decreased automobile reliance to increased biological diversity to friendly neighborhoods.

Viljoen is careful to acknowledge that there are presently no true CPULs in the world. The vision is thus forward-looking, and this project does not project what form Indianapolis will take upon a total conversion to a continuous landscape. Indeed, that vision includes the conversion of streets to non-vehicular corridors that might support bikes and pedestrians alongside vegetable production. Such “streets” would interconnect with parks, plazas and greenways from one end of a city to the other, thus forming a continuous landscape.

This project proposes the first significant node to a future CPUL plan for Indianapolis: the urban farm anchor. The site, however, includes a number of other elements that define a CPUL system and begin to describe Indianapolis’ green future. These features comprise three broader themes: ecology and habitat, public space and transportation. Together, these areas cover much of the terrain in the built environment. The urban farm is unique in amalgamating them in a productive context which ultimately tells a regional and cyclical story.

Ecology and Habitat

The effect of urban development on native landscapes is abundantly clear from our steel and concrete surroundings. How those effects reverberate throughout ecological
systems and eventually return to humanity’s immediate concern is increasingly apparent and more widely acknowledged today than in any previous point in history. These effects include species extinction (one need only to be reminded of the widespread bee colony collapses that first received major press in the summer of 2008), global warming, polluted air and water resources, and an emerging crisis brought on by urban waste streams. This project confronts these challenges in small ways that familiarize local communities with these issues and provide examples for countering their effects.

*Wildlife corridors*

Many urban design/planning guidelines note the importance of creating corridors that intersect the city and allow wildlife to move more freely through their native ranges. Such corridors carry the additional benefit of creating habitat where before there was none. These measures increase a region’s biodiversity, which in turn enriches the urban experience. Children, for example, who otherwise have little contact with the natural world, gain an opportunity to discover the dynamic interconnectedness of communities beyond the human one in which they live.

An additional benefit of increased wildlife habitat is the opportunity to welcome species that can work, so to speak, for the farm. Many birds and insects prey on pest insects that attack food crops. By creating habitat and food for these beneficial predators, the farm acquires allies to bolster its efforts to eschew chemical crop protection. In many instances, plant communities that achieve this effect can be planted amongst the crops (intercropping or companion planting). Elsewhere, woody plants and perennials can be combined for their ornamental value as well as their potential for attracting native wildlife.
There is an important caveat here. Permaculture principles instruct practitioners to closely observe patterns of long-term change and adapt to fit them, rather than adopting our current practice of bending natural systems to our will. Some of the best work on transforming industrial farms in rural areas in order to reconnect them with natural systems—and so support rather than destroy these systems—offers the same advice. For instance, rivers whose historic flooding sponsored a range of ecological services in the past have been reconstructed in order to create arable land in floodplains. The toll of this activity is severe, and it may be that only in honoring something like a river’s annual flooding are we able to begin to live more in concert with natural systems. This approach is not entirely germane to this project. In other words, when the hills are a highway embankment and the rivers a railroad line, it is difficult to imagine what natural processes will guide the hand of the designer. On a small scale, plants can be found to fit particular site conditions; on a larger scale, with the multifarious program on the site, some uses will be locked in for the foreseeable future.

Urban Heat Island

The effect of vast stretches of hardscape materials in the urban environment is well documented. Indeed, the LEED rating system, among others, includes a number of measures to offset the effects of pavements and black roofs that increase the mean temperature of urban areas. Adding vegetation is one of the most effective methods for addressing this issue, both because of the shade offered by trees and the ability for soil and plant transpiration to resist the heat trapped by typical urban materials.
Green spaces are cool spaces. More, green spaces are healthier than urban spaces devoid of plant life. The Environmental Protection Agency provides this synopsis of urban vegetation benefits:

Trees, vegetation, and green roofs can reduce heating and cooling energy use and associated air pollution and greenhouse gas emissions, remove air pollutants, sequester and store carbon, help lower the risk of heat-related illnesses and deaths, improve stormwater control and water quality, reduce noise levels, create habitats, improve aesthetic qualities, and increase property values.\(^{14}\)

It is clear, then, that creating aesthetically pleasing and productive spaces also makes an impact on a community’s health. More, the long-term challenge posed by global warming also receives an effective treatment from the farm and its soil, as well as the vegetation located in the non-productive portions of the site.

*Storm Water*

Alternative, or ecological, storm water management is not an area specifically addressed by Viljoen’s text on CPULs. However, it clearly fits the ethos of the CPUL concept. Alternative storm water treatment strategies help protect the local watershed, and they relieve the burden placed on municipal systems by increasing runoff quantities from growing stretches of impervious material in the urban environment. These ecological strategies carry the added benefit of having potential aesthetic and wildlife habitat value. More, they also address urban heat island issues, providing a cooler, healthier site.

Alternative storm water management typically consists of strategies to clean, treat (i.e. remove sediments and toxins) and slow the conveyance of stormwater runoff. Ultimately, the runoff is directed to pervious areas where it is allowed to infiltrate the soil. This process carries a number of benefits: decreased surface flows, volumes, and flow rates, and a subsequent decrease in water temperature, sedimentation rates and pollutant loads where the runoff meets existing water bodies. Other direct benefits include a cleaner water supply, decreased flood frequency and severity, and decreased stream erosion. As mentioned above, a significant indirect benefit is the creation of wildlife habitat for birds, insects and vegetation.

This project addresses stormwater flow from the highway adjacent to the site, as well as from impervious surfaces on the site itself. For example, a reed bed wetland augments the stormwater pipes that currently lay under a ditch between the site and the highway; additional strategies work in concert with these beds to treat runoff from site structures, such as roofs, roads and parking lots.

Though reed bed areas are not productive for the farm, arrangements with the city can provide subsidies for improved stormwater management divorced from the municipal system (a strategy currently being pursued by the Ballard administration) and the creation of wetland habitat (simple bird boxes help meet this criteria).

**Waste Streams**

Many urban farms address waste issues, typically with respect to compostable material. Indeed, any effort to reduce the flow of waste out of the city helps reduce the burden urban areas place on the communities that must receive garbage from the city. And,
where waste is compostable, it becomes food, adding to the closed-loop character of the farm and helping to build soil health. Where waste is not compostable, it is diverted to energy production efforts, as mentioned above.

Waste includes material from the farm itself. Programs created to collect compostable material from local neighborhoods and even restaurants (see ‘Community Integration’ below) aids the effort to reduce overall waste streams. Creative thinking might identify additional sources over time. For example, a new local service cleans up dog feces, which cannot be composted, from homeowners’ yards. At present, the day’s catch is sent to the landfill. But a biodigester could turn that waste into valuable energy and a nutrient source for the planting beds.

Public Space

In a fully functioning CPUL, the success of any given portion of the network depends on how adaptable the site is to the evolving needs of the community. It might be a market today, a playground in the afternoons and a quiet place to read tomorrow. The space gains its identity according to the manner in which the community uses it, and it becomes vital for that same reason.

Plazas

Plazas and squares characterize those spaces that have defined European public life for centuries. Their function changes, maybe even daily, but they remain an egalitarian destination. In this project, plaza space owes its existence to a transit system: where the train stops and the station sits, there one finds a node of activity. The plaza is where the
community conducts its business, where individuals begin and end their day, where public commerce feeds the private home.

Market

Almost an integral part of the plaza, this site will house a market. The market sells the farms produce exclusively, and it maintains space for other local producers to sell their products. It is a dependable alternative to the supermarket, and it carries the added benefit of social interaction. McKibben reports that farmer’s markets inspire 10 times more conversations than the typical grocery store.\textsuperscript{15} In this way, the farm gains another function, another purpose, which strengthens its position in the community as a hub and a locus of transformation.

Park Space

Viljoen envisions agriculture in urban parks and parks that connect with plazas and greenways and converted streets for pedestrian traffic. Of the many resources lacking in the near east side, park space is not one (see Fig. 34, App. A). Brookside Park and Spades Park are about 2 miles north, and they connect to the Pogue’s Run Art & Nature Park and Forest Manor Park further to the northeast. Highland Park is only about a quarter of a mile from the site. It was under development at the time of this thesis but will eventually contain a playground, basketball court, trails, a shelter and great views to downtown.

Connections between these parks and the farm further diversify the ways in which the farm can be used and accessed. While more ideal conditions might locate these park features

\textsuperscript{15} McKibben 2007, 105.
adjacent to a productive area and thus share energies and consolidate visits, this project is able to garner a similar effect with but the slightest remove.

The experience in Delft, the Netherlands, where land uses were deftly combined, is instructive. With admirable cooperation between different land use and policy-making bodies, the community gained an organic farm and recreation spaces, protected their watershed and created wildlife habitat.\textsuperscript{16}

\textbf{Transportation}

A key aspect of CPULs is the presence of people moving through the site, providing energy and introducing a fresh set of experiences for every fresh face that visits. Continuous networks are designed to shut out vehicular traffic and provide the means for bikes and foot traffic to transect a city. And yet, these are open spaces that support a variety of uses. Exceptions to the prohibition on vehicles include emergency vehicles, small motorized units like the Segway and instances where connections to mass transit systems are a sensible design solution.

\textit{Pedestrian and Bicycle System}

As mentioned, this urban farm is part of a larger vision wherein productive land is shared with additional land uses. The space must be active, and for activity to occur the space must be accessible to diverse audiences. Connecting the site beyond the road system

ensures that this diversity is achieved for the neighborhood and even for communities outside the Near East side.

First, the farm connects with the proposed Pogue’s Run trail to the east of the site. Second, a trail follows the rail line from the north and connects with the highly successful Monon Greenway, which presently terminates at 10th St., a quarter of a mile to the north. Finally, the site sits along roads currently identified for bike lane construction, and these are part of the design.

Public Transit Systems

A terrific advantage for this project is the recent announcement that the Northeast Corridor Rapid Transit system will likely locate a station in the vicinity of the site. While St. Claire St. appears to be the favored location, this thesis argues that a more synergistic site for the station is on Michigan St.

Combining this mass transit system with the other functions mentioned above ensures that the site will see steady and diverse traffic. Commuters from Hamilton County will mix with locals from Cottage Home and Highland-Brookside neighborhoods while they shop for the best in local produce and discover how the farm is creating a new generation of chefs from the Near East side’s disadvantaged population.
Governing Structure & Community Integration with the Back in Mind

Urban Farm

According to Elizabeth Mossop, Director of LSU’s landscape architecture program and partner at Mossop + Michaels, an urban farm must be a commercial venture in order to remain financially stable.17 This belief was echoed by Brad Peterson of Environmental Design Collaborative, who helped create the Black Creek Urban Farm in Toronto, Canada. An overreliance on public funds opens the project up to risks associated with public budget debates; some urban farms gain their initial footing, however, through a solicitation of funds in a non-profit setting (see Braddock Farm, below). Jeff Jaeger, the manager of Braddock Farm suggested that a social enterprise format might be the best suited for-profit arrangement for an urban farm which aims to provide a social service, particularly in disadvantaged communities.18

Social Enterprise

The social enterprise format provides the opportunity to secure commercial profit and relationships under consistent but collaborative leadership. It also provides the flexibility, as the project matures, to tailor the farm’s activity toward the social or the enterprise side of the business.

Because it is part of a larger transportation infrastructure maintained by governmental agencies, the train station and platform are obvious exceptions to the social enterprise relationship. It is important for developers to find a collaborative relationship that allows the

17 Interview with Elizabeth Mossop, Fall 2008.
18 Jeff Jaeger, email message to author, 11.10.2008
farm and its diverse land uses to share adjacent spaces with state/city property in a constructive, mutually-beneficial manner. This relationship might involve an agreement whereby the farm maintains certain portions of the station grounds for free access to the site.

The following text from Wikipedia describes the character of a social enterprise:

**Common characteristics of social enterprises**

*Enterprise orientation:* They are directly involved in producing goods or providing services to a market. They seek to be viable trading organizations, with an operating surplus.

*Social Aims:* They have explicit social aims such as job creation, training or the provision of local services. They have ethical values including a commitment to local capacity building, and they are accountable to their members and the wider community for their social, environmental and economic impact.

*Social ownership:* They are autonomous organizations with governance and ownership structures based on participation by stakeholder groups (users or clients, local community groups etc.) or by trustees. Profits are distributed as profit sharing to stakeholders or used for the benefit of the community.

(as defined by Social Enterprise London)

**Economic criteria:**

1. Continuous activity of the production and/or sale of goods and services (rather than predominantly advisory or grant-giving functions).
2. A high level of autonomy: social enterprises are created voluntarily by groups of citizens and are managed by them, and not directly or indirectly by public authorities or private companies, even if they may benefit from grants and donations. Their shareholders have the right to participate ('voice') and to leave the organisation ('exit').
3. A significant economic risk: the financial viability of social enterprises depends on the efforts of their members, who have the responsibility of ensuring adequate financial resources, unlike most public institutions.

4. Social enterprises' activities require a minimum number of paid workers, although, like traditional non-profit organisations, social enterprises may combine financial and non-financial resources, voluntary and paid work.

**Social criteria:**

5. An explicit aim of community benefit: one of the principal aims of social enterprises is to serve the community or a specific group of people. To the same end, they also promote a sense of social responsibility at local level.

6. Citizen initiative: social enterprises are the result of collective dynamics involving people belonging to a community or to a group that shares a certain need or aim. They must maintain this dimension in one form or another.

7. Decision making not based on capital ownership: this generally means the principle of 'one member, one vote', or at least a voting power not based on capital shares. Although capital owners in social enterprises play an important role, decision-making rights are shared with other shareholders.

8. Participatory character, involving those affected by the activity: the users of social enterprises' services are represented and participate in their structures. In many cases one of the objectives is to strengthen democracy at local level through economic activity.

9. Limited distribution of profit: social enterprises include organizations that totally prohibit profit distribution as well as organizations such as co-operatives, which may distribute their profit only to a limited degree, thus avoiding profit maximizing behaviour.\(^\text{19}\)

The Back in Mind Urban Farm’s commercial enterprise anticipates its income from a variety of sources:

- Produce sales on site: crops, fish, eggs, mushrooms, compost, etc.
- Contractual sales to area restaurants (Viet Village Urban Farm has negotiated multi-million dollar contracts with just a few New Orleans restaurants)
- Vermiculture kits
- Cooking classes

The Back in Mind Urban Farm’s social element consists of locally pooled leadership and cultivated relationships with several area organizations whose populations may benefit from the farm’s presence.

**Community Relationships**

As mentioned, the social enterprise nature of this project demands that the program be directed toward disadvantaged populations and that it rely on local resources for staff and leadership. Indeed, the farm is located in a diverse neighborhood, where more affluent portions of the community can bolster the economics of the project while their disadvantaged neighbors learn the skills and gain the experiences that might help lift the community as whole above its current level of unequal socio-economic groups.

**Community Organizations**

The following is a list of area organizations qualified to offer assistance to this project’s formation and continued success. Particular assistance includes the organization of community governance of the farm.
The Indianapolis Neighborhood Resource Center (INRC) is guided by its mission to “strengthen, develop, and empower neighborhood-based organizations and residents to be advocates for and instruments of positive change in their neighborhoods and to build and maintain a better community.”

INRC employee Josh Bowling was involved in choosing the site for this project and providing background information on the area. He is deeply involved in the organization of community stakeholders and the ongoing formation of a local food coop.

Cottage Home Neighborhood Association: organization of homeowners in the historic neighborhood adjacent to the site. Experienced board members and active community partners can serve on the farm’s governing board.

Near Eastside Community Organization (NESCO): a local volunteer-based community organization that sponsors a range of activities, including clean up days and home ownership training. NESCO is now housed at the John H. Boner Community Center, which is part of Community Centers of Indianapolis, a citywide social service network. NESCO volunteers are experienced organizers involved in the formation of community assets such as the former Eastside Community Investments, the Near Eastside Community Federal Credit Union, and the People’s Health Center. This is another valuable personnel resource that draws from a different base than the Cottage Home Neighborhood Association and thus diversifies the expertise and perspective that can be brought to bear on the farm.

The Felege Hiywot Center organizes garden workshops for near east side youths in an effort to teach valuable skills, as well as to promote goodwill, an appreciation for

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community service and environmental consciousness. The skills and experience of this group could be integral to the organization of this project, which in turn provides resources for Felege Hiywot’s educational efforts.

Women’s Prison

The Indiana Women’s and houses an average of 435 prisoners a day in a medium security facility. The prison maintains a range of social service programs, including programs designed to ease re-entry upon a prisoner’s release. The farm can offer training opportunities for growing operations and food preparation (see below). These programs can be run as a preparation prior to release, or as a halfway program upon release as a means of building skills and re-establishing a relationship between the land and those who have been severed from it.

Arsenal Technical High School

Arsenal Tech is part of the Indianapolis Public Schools system with an enrollment of nearly 2000, 67% of whom receive free lunch vouchers. It is part of an aggressive IPS effort to reinvent public education in Indianapolis. Like with the prison population, the student population finds volunteer and seasonal or part-time employment at the farm. A program wherein students walk the Pogue’s Run Trail to the farm and take after-school chef training classes is another opportunity for the farm to bring together its resources and those of area restaurants and enthusiastic local youth.

21 See How Are We Transforming Education in Indianapolis? http://www.headlines.ips.k12.in.us/archive/991.aspx
Production Partners

- Area restaurants are perhaps the most valuable partners for this project, because they can offer a wide array of aid. This includes contracts to purchase the farm’s produce (perhaps the largest source of income for the farm); trade in waste to fuel composting and biodigester activity; trade in spent oil for biodiesel production; partner chefs can also be recruited to teach cooking classes as part of the farm’s outreach activity (see below).

- Basic Roots, a residential-scale CSA located on the Near East side, currently sells produce to subscribers from a home-based garden. Not only does this indicate a market for local food in the area, but this project could help broaden Basic Roots’ clientele and production capacity. The operator, Kay Grimm, may also be a valuable leader for the farm’s organization.

- Farm Fresh Delivery is an online home delivery service, providing organic and, when available, local produce and artisan products to the Greater Indianapolis area. This is a crucial partnership for this farm, as it helps spread an awareness of the farm’s presence and activity, and it quickly builds a reliable income stream.

Community Gardens

Leased space for individual garden plots helps engage garden-minded members of the community with the farm’s mission. More, it creates a potential income stream for those with the entrepreneurial spirit or at least provides a low-cost opportunity to grow one’s own produce. Providing space for both production and sales increases the farm’s profile and creates opportunities for a vibrant and diverse public market.
Training and Employment Opportunities

The Back in Mind Urban Farm has a number of opportunities for community outreach, which helps create the enduring social networks that might simultaneously uplift declining neighborhoods and solidify the farm’s role in the community.

Growing Operations

The ½ acre Braddock Farm is able to employ 6-9 local youths through the growing season; they keep two or three through the fall and only the operations manager year long. The Re-Vision House Urban Farm in Dorchester, MA maintains 10 full-time employees from an on-site residential center for pregnant and homeless women; it provides five internships for area students in the summer. Growing Power employs around 30 people that run its robust series of programs, including educational training and internship programs.

These numbers provide a framework in which to estimate the employment capacity of this project. Comparing field sizes, the two acres of field crops on the Back in Mind Urban Farm may require 10-15 laborers throughout the growing season. Adding greenhouse duties—which include mushroom spore inoculation, aquaculture maintenance and harvesting, maintenance of greenhouse crops and vermiculture compost units, among smaller tasks—may demand an additional 2-5 employees. These particular duties will likely continue throughout the year, so these employees would be full-time. The farm would additionally require an operations manager, a bookkeeper, and a coordinator for outreach programs. These duties may require 2-3 additional employees., bringing the total for the farm at any given time to 15-25.
Cooking/Chef Program

A recent community gardens project in the vicinity of this project found that, while student volunteers enjoyed working in the gardens, they were not enthusiastic about eating the fruits of their labors. It appears fresh foods were not wholly familiar to them. Therefore, a program which offers cooking classes—or higher level chef classes—could help integrate the farms produce into portions of the community that are at present ambivalent about some fresh foods. As mentioned above, the populations might be identified at Arsenal Technical High School and the Indiana Women’s Prison.

Furthering the farm's partnership-building endeavors and its integration into the city fabric, instructors for these classes are recruited from the restaurants with which the farm maintains produce sale contracts and/or waste trading agreements.

Case Studies

Farms are not typically subjects of aesthetic design, and urban farms are no different. This is beginning to change, however. A couple of the following case studies follow the former trend and serve to illustrate the operational character of successful urban farms. In other words, they provide a picture of productive systems and organizational structures. The others describe two distinct design approaches to agricultural systems; these might be labeled spatial (a more traditional design language) versus flow (the use and creation of energy and material).

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22 Josh Bowling, conversation with author, Summer 2008.
Greensgrow Farm, Philadelphia, PA

Greensgrow Farm was formed in 1998 on the grounds of a former galvanized steel plant in Philadelphia, Pennsylvania. It claims to be the national leader in urban agriculture and has received ample media attention to this effect.

Because the site was a brownfield, production began in raised beds using a hydroponic system. Today, it has expanded to include heirloom vegetables, a Spring nursery and a community-supported farm stand (CSA).

The farm is an active community center and maintains an educational component to the farm through a series of programs on composting, hydroponic growing, and raising bees. In 2007, the farm began rendering biodiesel from waste oil from an area restaurant. The farm is also in the process of installing solar panels in order to meet some of its energy needs.

Greensgrow Farms also takes a role in the political process, acting as an advocate for rural farm communities and a voice for the concerns of urban consumers. Greensgrow Farms does not maintain any outreach or training programs for disadvantaged communities.
**Growing Power: Milwaukee, WI**

Growing Power is a non-profit and land trust organization that grew out of an urban farm in Milwaukee, Wisconsin. Today, the farm systems and social supports created by Growing Power founder, Will Allen, are found in a number of cities around the United States, including Chicago, IL, Forest City, AR and Lancaster, MA.

Growing Power farms are designed as training centers. In this role, they support “people from diverse backgrounds, and the environments in which they live, by helping to provide equal access to healthy, high-quality, safe and affordable food for people in all communities.” This process involves technical and hands-on training, as well as community outreach programs that provide new opportunities for struggling communities.

Growing Power Community Food Systems include processes that grow, process, market and distribute food in a sustainable manner. Food production systems include crops, aquaculture, vermiculture, livestock and bees. Growing Power maintains a robust composting system, augmented by vermiculture, in order to build healthy soil and thus eliminate the need for synthetic chemicals.
Growing Power is active in the policy realm, advocating greater civil support for urban and organic farming. Additionally, the organization created The Growing Food and Justice for All Initiative (GFJI), which is “aimed at dismantling racism and empowering low-income and communities of color through sustainable and local agriculture.”

**Braddock Farm: Braddock, PA**

At the time of this writing, this was an almost 2-year old project in the declining industrial town of Braddock, Pennsylvania. The farm sits on about ½ an acre that formerly comprised 8 residential lots; it is nearly adjacent to a steel mill.

Braddock Farm grows in raised beds (about 5000 square feet) and about 200 square feet of greenhouse space. The farm’s income is derived from its on-site farm stand and direct sales to restaurants. It aims to be economically self-sufficient within 3 years; at present it receives funding from a range of public and private entities. In addition to employing seasonal laborers from the disadvantaged community it is designed to serve, the farm is creating a certification program to train students in urban agriculture growing methods. This program aims to create spin off farms and, eventually, an urban farming infrastructure to replace the loss of economic infrastructure left in the wake of the area’s industrial decline.

*Figure 4: The Braddock Crew, photo from http://www.growpittsburgh.org/growpittsburgh/Projects/BraddockFarms*
This farm is part of Grow Pittsburgh, a larger urban farming non-profit organization dedicated to increasing the profile of urban farming and creating a new generation of urban farms and farmers. Braddock Farm also receives substantial support from the Braddock Mayor’s Office, which views the project as a major part of the future of economic development in the area. The farm’s operational manager, Jeff Jaeger, suggested the social enterprise structure to this author as a means of organizing urban farms and avoiding the vicissitudes of public funding.

_Viet Village Urban Farm: New Orleans, LA_

The Viet Village Urban Farm is an example of spatial design in the context of urban agriculture, work for which the project won a 2008 ASLA Professional Award: Analysis and Planning Award of Excellence for the firm, Mossop + Michaels. Any discussion of the project’s spatial character should not, however, ignore the substantial planning and programming performed for the site. The project grew out of a response to the devastation of Hurricane Katrina and replaces...
the nearly 30 acres of informal gardening being performed in a largely Vietnamese community. The firm describes the project on the ASLA awards webpage:

The design team assisted the community with the design of the environmental infrastructural systems needed to support an organic urban farming operation, the design of a market area to serve as a community resource and economic catalyst for the community and the development of a flexible, strategic plan for seeking funding for the project and incorporating various labor resources.23

The project was guided by an open public input process and resembles the character of the social enterprise structure pursued for this project. Viet Village will eventually support individual community garden plots in conjunction with larger commercial plots that will more directly support the site financially. Space has also been reserved for chickens and goats to be raised in a traditional Vietnamese manner. Community collaboration identified these key goals for the enterprise as a whole:

- Establish a Certified Organic farming practice that includes integrated pest management, composting, crop rotation, and cover cropping among other organic practices
- Become a model for low-tech sustainable site development in the New Orleans area through the use of bio-filtration of water resources and alternative energy sources such as wind, and passive and active solar power
- Establish relationships with area restaurants and grocery stores to provide locally grown produce as a part of the localvore food movement
- Create an economic and cultural resource for the community

Create a cultural resource for Vietnamese-Americans along the Gulf Coast

This project differs from others due to its clear organization of site circulation (Fig. 5). In addition to supporting the movement of farm implements, generous pedestrian paths allow the site to be experienced from within by visitors and provide clear access to site amenities. These include ball courts and a playground, a market, a community pavilion and parking areas. The inclusion of land uses beyond crop production suggests the nearness of the design with the CPUL concept. Indeed some 3,000 people are expected to use the site for Saturday markets, more on festival days. Finally, the design includes a complex irrigation system that utilizes bioswales to return post-irrigation water to its source in a set of sub-watershed ponds. Given the site’s high water table, this feature was one of the key design opportunities for the project.

*Ocean Arks International Flow Chart: Burlington, VT*

This farm concept designed by Ocean Arks International is similar to the ZERI concept; it is represented in Fig. 6. It is more specific than the ZERI flow chart, however, as it is

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24 ibid
considered in conjunction with existing resources in Burlington, Vermont’s Intervale Agricultural Eco-Park. The project captures waste heat from an area wood-fired power plant to fuel a series of year-round greenhouses. The greenhouses house facilities to convert byproducts from local food manufactures, including a brewery, and farms to raise fish, shrimp, mushrooms, salad greens and create composts. This is a closed system, where nutrients returned as waste products from one process are used to fuel subsequent processes. This type of waste/food sharing is a key element to building soil, creating downstream nutrients and eliminating the waste stream from the site.

**Conclusion**

As these case studies demonstrate, successful urban farms are neither rare nor an enigma. They are the result of individual efforts as well as organized public support. This project is unique in its proposed organizational format, which relies on wide community stakeholder support. In return, the proposed farm promises robust efforts to provide new and valuable opportunities to that same community.

The Back in Mind Urban Farm offers other advantages as well. It is a good neighbor: the farm improves the environmental character of the area, treating stormwater runoff and creating new layers of native vegetation; it diverts waste streams while simultaneously transforming some of that waste into energy; it provides public gathering space; and, most importantly, it provides fresh, local food and a venue to grow and sell your own share of fresh, local food. Finally, the farm offers other communities an example for the productive reuse of underused urban land which ultimately suggests a new paradigm for the
relationships between urban denizens, the environment in which they live and the food they eat. While this proposal suggests a steep developmental curve, it hopes to illuminate a new manner of sustainable urban life toward which we are compelled to work.
Part Three: Design Exploration and Development

Site Selection

The general area in which to site the Back in Mind Urban Farm was determined according to the following criteria:

1. The farm ultimately needs to provide access to high quality food for underserved populations, namely areas that have lost grocery stores as a result of depressed economic conditions.
2. The farm intends to provide employment and training to populations lacking such opportunities and so requires proximity to these populations.
3. The farm requires access to more affluent markets, including restaurants, in order to bridge communities and establish its financial independence and stability.
4. The farm should be sited such that it may act as an anchor in a larger network of passive, pedestrian-oriented spaces and alternative transportation options.

The Near East side of Indianapolis satisfied each of these criteria for reasons described below. The site was further defined under the advisement of Joshua Bowling of the Indianapolis Neighborhood Resource Center (INRC). The southern portion of the site is shared with the Midland Arts & Antiques Market at 907 East Michigan Street. Bowling identified this lot as a source of open space and, importantly, a spatial and cultural bridge.
between communities and land uses. In order to increase the overall acreage of the farm, additional properties were identified to the north of Michigan St.

Many constraints affected this process, chief among them the preponderance of brownfields on the Near Eastside. Sizable vacant lots are at a premium in the city, of course, but clean vacant lots are rare indeed. As a result, this project proposed development on lots with existing structures and pavements. The manor in which these issues were addressed is discussed below.

**History & Cultural Character**

The Polis Center at IUPUI in Indianapolis reports that the Near Eastside residents have a history of organized efforts to improve their community. This trend continues, even in the face of significant economic pressure. So, while community gardening and campaigns for bike lanes contribute to the improvement of the area, a pack of feral dogs made its home on the stream at the edge of the project site. This is illustrative of the dichotomy in the Near Eastside landscape.

The neighborhood was first platted for housing in 1849 by heirs to former governor, Noah Noble; housing demand increased with the introduction of a U.S. Arsenal in 1863. Development continued at a rapid pace and included the creation of Brookside Park in 1898. At 108 acres, the park became a major recreation center for the city’s inhabitants and was part of a larger effort to create a city-wide park system under the guidance—at separate times—of landscape architects Joseph Earnshaw and John C. Olmsted. Their efforts stalled under political interference, and George Kessler was hired

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1 See http://www.polis.iupui.edu/RUC/Neighborhoods/NearEastside/NESNarrative.htm
in 1908 to move the process forward. What followed was the City Beautiful-inspired parkway system that now bears Kessler’s name.

Kessler’s plan is an early example of what landscape architecture now terms green infrastructure, and it demonstrates Indianapolis’ early recognition of the benefits inherent in green city spaces and recreational corridors. Importantly, Kessler’s plan addressed the city’s waterways and identified Pogue’s Run as a key element in his parkway system. Today, efforts are underway to develop a trail system along Pogue’s Run that will connect Brookside and Spades Parks in the north to the southern terminus of the Monon Greenway at 10th St. and, eventually, the downtown area. Other development efforts that will effect the character of the area include the newly redesigned Highland Park just south of the project site on New York Street; bike lanes and pedestrian-friendly sidewalks along Michigan and New York Sts.; a major gateway project further east at Emerson Avenue and Interstate 70; investment in the Pogue’s Run Art & Nature Park, which is designed to relieve the CSO burden on Pogue’s Run and create recreation and habitat opportunities; and grant funds are presently at work identifying brownfields north of the site with the expectation that new development will begin to transform these neglected areas.

Deterioration has not afflicted the entire Near Eastside. Two of the neighborhoods to the east of the site were listed on the National Register of Historic Places at the time of this writing: Cottage Home, which is nearly adjacent to portions of the site, and Woodruff Place less than a mile away. Cottage Home was a recent recipient of Green Infrastructure grant money from the City of Indianapolis. The funds will be directed to “create a multi-use, multi-generational green community space that can be
used as an example of environmental stewardship, especially responsible stormwater
management techniques.”² Woodruff Place has been a prominent Indianapolis address
since its creation in the late 1880’s and continues to display an exceptionally strong sense
of community. In addition to these neighborhoods, new luxury condominiums continue
to be built along College Avenue on the west side of the interstate.

These affluent areas notwithstanding, the residential fabric of the area in general
was in decline at the time of this analysis. Much of the area has still not recovered from
the exodus of residents that began in the middle of the 20\textsuperscript{th} Century. That trend has
abated today, but after decades of emigration the Near East side became the last resort for
struggling people and has foundered due to a lack of jobs. The demographics are
revealing: nearly 60\% of the area adults and fully 1/3 of children live in poverty; nearly
50\% of the area’s houses are worth less than $50,000; nearly 36\% of residents lack even
a high school diploma, while another 27\% have only that; around 80\% of residents earn
less than $50,000/year; unemployment is consistently around 12\%. It is in this light that
the crumbling tenure of the Near Eastside’s industrial employers was seen as a crucial
element in the area’s potential transformation.

Two other institutions define the broader character of the area: Arsenal Technical
High School and the Indiana Women’s Prison. Arsenal Tech is part of Indianapolis
Public Schools with an enrollment of nearly 2000, 67\% of whom receive free lunch
vouchers. It is located on 78 acres in the heart of the community and is part of an
aggressive IPS effort to reinvent public education in Indianapolis.³ The Indiana

³ See How Are We Transforming Education in Indianapolis?
http://www.headlines.ips.k12.in.us/archive/991.aspx
Women’s Prison occupies 14+ acres and houses an average of 435 prisoners a day in a medium security facility. The prison maintains a range of social service programs, including programs designed to ease re-entry upon a prisoner’s release. Both of these institutions play a significant role in this proposal.

**Opportunities and Constraints for the Back in Mind Urban Farm**

Following a period of railroad-related functions, including smelting operations, the site itself was at one time dedicated to building and construction trades. The Midland Art & Antique Mall was once a door and sash manufacturer. The portion of the site north of Michigan St. has been largely under common ownership within a single family for about 80 years. It was the original location for Tiffany’s Lawn and Garden Supply, which has since moved to the northwest side of Indianapolis. An insulation company still occupies a portion of the site directly east of the railroad tracks. At the time of this writing, a design/build landscape architecture firm was considering basing its operations on the former Tiffany’s site.

Regardless, the character of this area changed drastically from its early industrial days. The population, however, was noted to be demographically mixed. Given the proximity of these diverse populations, the current state of the site was judged to be egregiously unproductive and lacking in any significant assets for the community.
Inventory and Analysis: Context

The location of the site on the Near Eastside of Indianapolis, IN, is shown in Fig. 7. As mentioned, the site is located in a declining industrial area, with the antique mall providing an oasis of commercial and cultural activity. The site investigation noted that prosperous areas lie directly to the west and on the other side of the highway along College Avenue and around the Mass Ave. Cultural District; to the east are primarily neighborhoods. Perhaps the most imposing feature of the site, as concerned this study, was Interstate 65/70, which traverses the western edge of the site on a 14+ foot (height of underpass) embankment and limits the movement of commercial activity eastward from College Avenue.

A number of significant features and businesses were noted more immediate to the site (see App. A, pg. 105, for additional graphic material). Pogue’s Run flows along the eastern edge of the site in a largely channelized stream bed. The stream terminates at New York Street just south of the site boundaries; to the north it leads through the Arsenal Tech campus to Spades Park, Brookside Park and finally to Pogue’s Run Art & Nature Park about 3 miles to the

Figure 7: Site Location
northeast. Water quality in the stream was shown to be extremely poor and habitat potential very low. Finally, Highland Park, newly renovated with trails, ball courts and playground, was noted about ¼ mile from the site, which largely obviated any need to duplicate these services as part of the program for this proposal.

Also noted was an out-of-service rail line which bisects the site. The line consists of double tracks for diesel freight trains and is part of an initiative to bring a commuter rail line to Indianapolis. The final study commissioned by the Indianapolis Metropolitan Planning Organization proposes a rail station be placed at St. Claire Street on the northern boundary of the site.

Each of these features is discussed in more depth below.

**Current Land Use**

As noted previously, land use on and around the site is dominated by a core of light and heavy industry, heavy commercial and a perimeter of residential zones (see Fig. 36, App. A). The preponderance of small vacant lots testifies to the recent fate of business in this area. What remains active for the most part fits the light industry description. This includes several shipping/distribution businesses with exits on New York St., Vermont St. and Michigan St. A cheap masonry unit building filled with chemical vats sits directly across the rail line from the antique mall; it is for lease.

Obvious tensions arise from the coexistence of the residential and large educational areas

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with industrial uses, and this building is, in a way, symbolic of the disparity of land uses on the Near East side, where homes lie so close to chemical shipping companies.

**Circulation and Access**

*Interstate*

This is the largest and most obvious structure on the site. It contributes noise and air pollution and is a source of polluted stormwater that is piped to areas around the site. The embankment and highway severe the site from the more active areas west of the highway, though given the highly residential character of the area, this is not necessarily a detriment. More significant is the obstacle the road poses to development dollars crossing east.

An interstate on-ramp is located at Michigan St. Other than this at-grade ramp, the embankment is only broken by 14+ foot overpasses located at each of the East-West streets on the site. South of Michigan St., the highway is separated from the site edge by Pine St.

A shadow analysis confirmed that the site receives adequate sun to support agricultural activity throughout the growing season. Also, the visibility the highway provides for the farm is important. Travelers discovering the site this way will be able to see the full spectrum of the site’s activities, including the many ways the site can be accessed—by train, from the Monon Greenway, by foot, bicycle or car.

*Roads*

Four East-West roads were noted that either border or transect the site (from North to South): St. Claire St., Michigan St., Vermont St. and New York St. (the project
site is not directly adjacent to New York St.). Michigan St. is one-way westbound; New York is one-way eastbound. Neighborhood groups have expressed a desire to open both roads to two-way traffic, while providing greater bike and pedestrian alternatives.

Site access occurs along Michigan and Vermont Sts., both of which were shown to carry heavy truck traffic due to existing businesses. Narrow sidewalks were noted on both roads. Given the stakeholder interest in creating bike routes along these roads (Michigan St. is the likely candidate), the sidewalk conditions within the site boundaries can change to create a more comfortable experience and facilitate better site access.

The current character of these roads is documented in site photos, Figs. 37 and 38, App. A.

**Rail**

As previously mentioned, the Northeast Corridor Rapid Transit System study prepared in 2008 proposes to use the rail line which bisects the project site. This creates valuable connections, particularly given the proposed station to be constructed at St. Claire St. in the ROW space to the west of the tracks. It also offers a degree of visibility to the project that it might otherwise lack. Also mentioned above, a more conspicuous and—for this project—advantageous location for the station would be along Michigan St. The vehicular traffic is greater here. More, following older historical trends, a station here would locate a hub of activity where it is needed most: in the marketplace.
Pogue’s Run and the Park System

Also described above, the investigation noted that Pogue’s Run offers a physical connection along a natural feature to the park system which includes Brookside Park, Spades Park and Pogue’s Run Art & Nature Park (see Fig. 34, App. A). A trail is planned that would follow the stream from the park system to its above-ground terminus near Highland Park on New York St. (Fig 8). This trail would run through the Arsenal Tech campus, thus providing a pedestrian corridor on which to build subsequent relationships between the farm and the school (this is addressed above in Part Two).

Food Distribution Focus Area

The proximity of the farm to existing restaurants and markets is illustrated in Fig. 39 in App. A. As discussed in Part Two, partnerships with these restaurants were identified as a key element to establish in order to demonstrate the potential for the project’s financial independence. According to practitioners and urban farm designers, an urban farm’s ultimate success and longevity depend on its ability to secure
commercial profits. This is accomplished in large part by negotiating contracts with restaurants whose clientele appreciates the concept of local, “organic” food production. For the most part, these types of higher-end and boutique restaurants and cafes were identified around the Mass Ave Cultural District, which includes 37 restaurants; other opportunities may be available in the Hispanic section east of the site. While these assets exist outside the project area, the responsibility of the farm was stated to include the facilitation of the trade of food and wastes with its partners.

**Inventory and Analysis: Site**

Five areas discussed in this section are highlighted in Fig. 9. These areas are grouped by common conditions and/or by significant spatial relationships, in order to facilitate a discussion of the site’s opportunities and constraints. Portions of this discussion are visually documented in App. A (pg. 105); site photos, shown in Figs. 37 and 38, also aid in visualizing the area.

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6 From conversations with Brad Peterson, Environmental Design Collaborative; Elizabeth Mossup, Mossup + Michaels; Jeff Jaeger, Braddock Farms, Braddock PA.
Area 1

This area begins at the south end of a utility ROW which supports a cellular network tower and buried fiber optics cables. The dominant feature at the north of the site, then, is a 150’ cell tower and its supporting equipment building. The surface of area one is a mix of soil and deteriorating pavement, which is largely covered with a light humus and pioneer “weeds.” Because this area is the least developed area on the site (excepting the turf area which shares a lot with the Midland Art & Antique Mall), is it conducive to a transition to crop fields.

Furthermore, as with the rest of the site, this area receives ample sunlight. A shadow analysis performed by the author found that no significant shadow is cast by the westerly highway embankment until late into the harvest season, and that is not until late in the day.

This portion of the site is protected from the street, though it is adjacent to the embanked highway. It is also adjacent in the east to the railroad tracks which will carry the Northeast Corridor commuter train, as well as some freight. The Monon Greenway, which terminates at present less than ½ mile to the north of the site on 10th St., will be brought through the site between the tracks and the area to transition to field. Combined, these three paths—highway, railroad and greenway—offer significant views of the farming activity and its inherent cycles. There is some threat of airborne pollution from the highway. This will be addressed in part by vegetation introduced to the embankment in order to block as much of the particulate as possible. It worth noting that none of the professionals with whom the author spoke regarding this project expressed dire concern
over this aspect of the site. While it was mentioned as constraint requiring attention, it was not perceived to be a categorical impediment to the project.

A drainage ditch lies between the embankment and the field area. At present, the ditch contains two drain inlets which feed stormwater runoff from the highway into the city stormwater system. The ditch offers an opportunity to demonstrate ecological methods of stormwater management. A reed-based wetland, for example, might adequately address the volume of runoff that hits the ditch while simultaneously cleansing the water, offering habitat, and increasing the integrated profile of the project. It is unlikely that any crops grown in the fields will draw from the soil any water filtered through this wetland due to the manner in which the crops will be grown. This does not, however, negate the wetland’s benefit.

Area 2

This portion of the site is adjacent to Michigan St. and provides entry to the site. At its westernmost point, this area is currently occupied by a single mobile home. The grade is slightly higher than the remainder of the site, and an I-70/65 entry ramp runs along its western edge. The grade of the ramp begins at street level but rises quickly to the typical 14+ foot embankment.

The remainder of the site is occupied by six buildings constructed at different times. Among these buildings is a non-denominational church, the Foundation of Truth Worship Center. The church has a negligible congregation and is periodically inactive. A sunken loading dock abuts the building at the eastern edge of the site and comes directly off the street.
The surface of this area is mostly paved with a chain link fence surrounding most of the lot. All of these buildings are currently for lease; none are of significant quality. The rear of the lot is a combination of paved areas broken up with weeds and areas dominated by weed growth.

Michigan St. is a major artery from the East side of the city into the downtown area. As mentioned, it also provides access to the interstate. Therefore, traffic through the site can be heavy and fast. However, it is worth mentioning that at no time during the author’s many site visits was traffic perceived to be significant, and crossing Michigan St. on foot was easily accomplished.

The rail line marks the eastern edge of the Area 2.

Area 3

This CTX-owned railroad consists of two sets of tracks designed for freight. The ROW varies but generally occupies about 60-120’. As mentioned, this line will support the Northeast Corridor transit system. In order to accommodate that service, the tracks here can be reduced to one set in order to decrease the separation between the sites bisected by the railroad. This also provides a more human-scaled point-of-entry for anyone arriving at the site by rail. Finally, reducing the amount of ROW creates space to bring the Monon Greenway south and through the site, which would increase the level and variety of access to the site. A station/platform on Michigan St. balances several needs: for the transit system to be visible and accessible to traffic (Michigan St. is more heavily travelled than St. Claire St. to the north or Vermont St. to the south); to provide
ready access to the downtown area, due west on Michigan St; to provide service for neighborhood residents; and to create a major circulation node for the farm.

*Area 4*

At the front of this lot is an active insulation shipping business in a decent brick building. Because this project envisions a new character to this area, this business can be relocated to the new Sherman Park Business District under development less that two miles east on Michigan St. If the Back in Mind Urban Farm receives municipal support, some aid (e.g. tax breaks, friendly terms for lease agreements, etc.) could support this transition. Because this portion of the site is adjacent to Michigan St., it offers opportunities to support a transit station/platform. This is a high volume road, providing the station with needed visibility. This area is also ideal for parking for the farm and/or a park-and-ride program for the train. Capturing some of the railroad ROW increases this capacity. Moreover, the visibility of this area is an important aspect for the farm itself. It may be the first part of the farm seen by travelers coming across Michigan St and so the first opportunity to establish the site’s character for this point of entry.

The back half of this lot is vacant and occupied by several structures of insignificant quality. It is paved and weedy. The building in the northeastern corner of the site is owned by the Superior Oil Company but is currently unused. This portion of the site sits on a square concrete pad about three feet above the surrounding grade, perhaps to accommodate sunken chemical vats inside the building. The structure is in good condition but of insignificant character.
This portion of the site provides the most obvious entry point for pedestrian traffic from Cottage Home and surrounding neighborhoods north of Michigan St. This area, then, is the first opportunity to define the site’s new character to the community. As such, some type of growing operation is ideal for this space. Access to the rest of the site is crucial to ensure a contiguous and delightful experience for pedestrian traffic, and the proximity to neighborhoods recommends this area as a candidate for community gardens.

Pogue’s Run marks the eastern boundary of Area 4. This polluted stream is receiving more attention of late, including efforts to curb its combined sewer overflow burden. The role of Pogue’s Run is explicated at greater length below, but it is important to note here that an Indy Parks and Recreation-proposed Pogue’s Run Trail would enter the site at this part of Area 4. The design must accommodate trail traffic through to Michigan St. More importantly, the presence of Pogue’s Run offers an opportunity for this project to demonstrate a 21st Century approach to development along a waterway. This can include reconstructed banks, the reintroduction of native habitat, and the protection of the waterway from urban stormwater runoff, all of which would occur between the railroad tracks, the potential parking mentioned above and the channelized stream 12’ below grade. South of Michigan St. the stream lies outside the project boundaries and poses special constraints best addressed in a separate venue.

Directly north of Area 4 is an active, well-maintained business, Marian, Inc., and its expansive paved lot. This poses a significant runoff burden, both for the farm and the stream. This affords another opportunity to demonstrate alternative stormwater management techniques.
Area 5

This lot is occupied by Midland Art and Antique Mall, a gravel parking lot, several out buildings and an unused turf-covered area. The site is bordered to the west by Pine St.; to the north by Michigan St.; to the east by the rail line; and to the south by Vermont St. There are narrow sidewalks on each of the streets. A chain link fence surrounds the areas of the lot not occupied by buildings, and entry to the lot is found on both Michigan and Vermont Sts.

The Midland building gives this project an immediate and diverse audience. Its present use provides vendors with space to sell eclectic collections of art and antiques. Their collective clientele is relatively diverse, and the business is well-established enough to have opened a second location in Hamilton County.

The out buildings run along the edge of the sidewalk on Michigan St. They are of poor quality and obstruct the view north of Area 5 (i.e. to the remainder of the project site). Removing these would allow for a more continuous experience of the site. The turf area is underused and ideal for growing operations. It lies along the railroad and so would benefit from the visibility offered by passing trains and the greenway extension mentioned above. Crops would work in this space; chickens may also be welcome here, given the proximity to public eyes (for security) and the quirky nature of the Midland Art & Antique Mall. These operations could be combined for maximum benefit; chicken manure collected in a coop can be processed on the farm for compost or biodigester energy production.
Soils and Pollutants

A considerable issue that encumbers this project is the status of the soils on which crop production will take place, as well as the threat of continued contamination coming from the highway adjacent to the site. A formal study of the soil has been performed and revealed heavy metals contaminants, among others.

Soils

The soil contaminants for the productive portions of the site can be addressed by various methods. The most time-consuming method would be to remediate the soil through phytoremediation techniques, which utilize plants adept at absorbing contaminants to strip the soil of any toxins. The plants are removed once the soil has been adequately decontaminated. This approach is still somewhat exploratory, and its effectiveness is not thoroughly understood. Suffice to say that the regimen of plants must match the contaminants to be removed. Given that the soil will produce edibles, additional measures may be required pending robust testing.

A related permaculture solution might be to stay the pitchfork, so to speak, and abandon the site to nature for an extended period of time—measured in years. Any plants that colonize the area—and some opportunistic “weeds” are already doing so—may perform the remediation work, building soil health in the process. Once testing confirms the soil’s cleanliness, the opportunistic plants could be removed and/or plowed under and planting begun. Care should be taken not to mulch or plow under any plants that have absorbed and retained contaminants.

Another approach would be to import soil. This is typically not a desirable solution, as it robs some separate land of its native soil. However, given the rate of
development in the counties surrounding Indianapolis, it is possible that soil that would otherwise go unused could be obtained from a greenfield development project. If the soil’s provenance is agricultural, it may be necessary to remediate the soil in order to eliminate any lingering pesticides or herbicides.

A final approach is to avoid contact between crops and soil altogether by planting in raised beds. The demolition that would necessarily occur on the site offers a unique opportunity to salvage concrete blocks and other materials for bed construction. This method has been widely used, from Cuba’s Organopónicos to the raised beds on the former steel plant grounds of Greensgrow Farm in Philadelphia.

*Future Contamination*

There exists some risk of future/on-going contamination from the vehicles using the adjacent interstate. This contamination includes exhaust-born air pollution and polluted storm water runoff; airborne dust is an additional concern.

Presently, a ditch separates the bottom of the highway embankment and the site to be developed. A municipal stormwater piping system, including two drain inlets, lies under this ditch. While the ditch offers some protection from highway runoff, creating an ecological water treatment area would provide additional filtration and a more robust (and aesthetic) boundary for the site.

Addressing airborne contaminants may be more difficult. A simple tree canopy may be useful, but care must be taken to avoid obstructing views of the farm from the highway or limiting the sun exposure across the site.
**Demolition**

There will be substantial demolition of site pavements and structures in order to construct this project as proposed. No project that wishes to minimize its environmental impact approaches this phase of the process willy-nilly. Much of the material to be removed from the site can actually be reused in a different form, which reduces the amount of material dumped in landfills, limits the mining of new materials, and, in the case of some types of materials, actually carries remnants of the sites past into this new chapter in the site’s history. Of the former types of materials, old concrete and the concrete masonry units used in existing structures can be ground into aggregate used as base layers for new hardscapes and foundations.

Of the latter, bricks from the existing insulation building can be salvaged for use as paving materials, particularly where smaller paving bands denote significant design elements, such as the point at which trails emerge or where pedestrians cross the street.

Steel is another salvageable material and can be used to construct ornamental features that repeat elements presently found on the site (this aspect is described more fully below). Existing features on the Midland building, shown in Fig. 10, can be created elsewhere from this salvaged material. These same steel pieces may also serve as

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*Figure 10: The steel from the picture on the right can be used to repeat the structure from the picture on the left*
structural elements. Either way, this approach marks a thoughtful effort to steward the site from the very beginning of the project.

**Summary of Opportunities & Constraints**

Perhaps the most significant aspect of this project was the effort to transform a blighted area into a verdant, productive, active community hub. In that sense, it envisioned a process whereby vacant concrete lots broken by opportunistic weeds became sources of nutrition, income, learning and experience. Pedestrian corridors that break off before traversing the site boundaries were extended, offering new opportunities for movement to, through and beyond the site. And, significantly, a range of environmental threats were identified as candidates for effective, holistic treatment. The site was noted to be constrained by the presence of the highway and the condition of the soil and air. These elements, however, were shown not to be insurmountable and, in the case of the highway, potential assets for the community. Moreover, soils were shown to be remediable, which demonstrates a commitment to an emerging and widespread effort to clean up the messes of past generations.

**The Design Process**

Just as reused elements denote a departure from the conventional use of materials, so do the opportunities offered by the site transform a repudiated approach to land use into a more deeply considered effort to build healthy, productive communities. This project proceeds from such a foundation, and the goals contained in this sentiment guide
the design of the Back in Mind Urban Farm. The following sections detail these goals and report the program that emerged from their consideration. Finally, the discussion will focus on the design process, from conceptual design to the final masterplan.

**Goals and Objectives**

The goals and objectives of this project have been implicitly stated throughout this paper. It is important, however, to reiterate them clearly and all together before proceeding into a more comprehensive discussion of design decisions.

**Goal One**
Create a zero-waste, low (no)-input community food production/distribution operation in Indianapolis, Indiana, which builds soil and maximizes production capacity without compromising system integrity.

**Objectives**

- Energy use collected through alternative systems: solar, wind, biogas
- Growing operations to follow principles of integration established by proven systems: ZERI, permaculture, Bio-Intensive gardening
- Water: capture and reuse
- Create community compost facility to reduce area waste stream and supplement farm needs
- Create regular market to promote farm sales
• Develop partnerships with area restaurants to provide income stream for farm solvency

**Goal Two**

Create and enhance circulation and access to and through the site. These networks will help establish the farm as an active community node, aid the development of larger transportation and trail plans, and demonstrate how multimodal transportation can work for the city of Indianapolis.

**Objectives**

• Develop site around alternative transportation networks: greenways, pedestrian connections, rail transit, bus system, etc.

• Develop access points for each community stakeholder group: neighborhoods, schools, sidewalk pedestrians, trail users, those arriving by vehicle or train, etc.

• Demonstrate concept of continuous landscapes by designing productive elements along transportation corridors. More, the point(s) of confluence for these corridors is a major production node, reinforcing the effort to reorient the role of food production in community life.

**Goal Three**

Enhance community health and create new outreach opportunities. Design spaces for flexible public use, in order to provide a platform from which community
cohesiveness can mature and which will establish the site as a root for community activity.

**Objectives**

- Use farm systems to restore/create wildlife habitat and enhance the quality of the urban environment through plant selection and tree canopy considerations
- Allow for non-productive spaces that treat the site’s stormwater burden and create additional habitat space
- Create community garden plots as well as market/distribution space for farm and individual plot produce
- Create supports for employment/training opportunities for community residents, including school groups and inmates of the Indiana Women’s Prison. These supports include facilities for instruction on compost management, integrated systems management (aquaculture, vermiculture, crops, etc.), cooking and business management.

**Program**

The following program satisfies the aspirations of this project set forth in the goals and objectives. Where possible, it provides general yield estimates for the productive portions of the site. It further covers facilities, constructed wetland space, public spaces and major paths.
Production

Greenhouses

There are three greenhouses, each about 2750 square feet. These house the vermiculture-aquaculture-hydroponic and mushroom systems described in Part Two. Additional space for outdoor vermiculture beds is located on the east end of the greenhouses.

In a similar amount of space, Growing Power raises 3000 tilapia and 1500 Lake Perch in addition to 300 sq. ft of water cress and several hundred pots of greens and vegetables per greenhouse. The Southeast False Creek Urban Agriculture Strategy (SFCUAS) document prepared for the City of Vancouver states that an intensive aquaculture system can yield fish for 5000 people on .4 acres, or 17,424 square feet. With a little less than half that amount of space, the project could potentially raise fish for about half that number of people, or around 2500.

Chickens

The chicken paddocks provide about 1.7 acres of forage for egg-laying chickens. Rhode Island Reds, a good utility breed, are probably the best choice of bird for the purpose. The acreage is divided into four pens; an egg mobile, or mobile hen house, is
moved by tractor between these pens to prevent the chickens from wearing out any one spot of the pasture (see Fig. 9). Each pen contains a variety of ground crops, such as beans, grains, clover and chicory. Additional layers of shrubs and fruit or nut producing trees help encourage the hens to spread throughout each pen. Hawthorn trees that retain their thorns are helpful in preventing predator birds from attacking the flock while also providing native plant cover.

Managing livestock on pasture is not a science. Therefore, it is wise to begin this project with a small flock of birds—the author was told 30 birds was a conservative number with which to start. Birds managed in this manner lay one egg six days out of every week. At this rate, a flock of 30 hens would provide 180 eggs, or 15 dozen eggs per week. It is likely that the flock size could increase by 15-30 birds as its behavior and affect on the site is better understood. A flock of 60 hens would produce about 30 dozen eggs per week.

Chickens further benefit the farm by providing valuable compost fodder. Pasture-raised hens are enclosed in a hen house each night. The litter from the bottom of the hen house is collected and mixed into the farm’s compost operation, increasing the overall nutrient value of the compost. Finally, the egg mobile can be pulled at the beginning and end of the season into the main crop fields and the orchard, where they help rid the fields of pests as well as deposit their valuable droppings and thereby fertilizing the soil.

Appendix B, from Midwest Permaculture, lists many useful and productive woody plants, perennial forbs and annuals that could populate the chicken pens.
Crops

- Primary Fields: the primary crop fields located at the north of the site provide about 1.7 acres for mixed vegetable and fruit production. The fields are arranged in roughly 50’ sections, each with 10’x5’ individual beds. If worked using biointensive techniques, this amount of land could produce over 100,000 pounds of vegetables and fruits in a 4-6 month growing period.

  The ultimate layout and planting schedule for this land will be established by an experienced farmer who can accurately gauge the market and balance environmental conditions to the greatest effect. Appendix C provides charts to guide the proper rotation and intercropping arrangement of crops, as well as data on production levels. Appendix D lists a variety of good cash crops for consideration.

- Orchard: about 1.1 acres can be devoted to orchard. According to a report from the Dept. of Horticultural Services at Cornell University, the Tall Spindle orchard system appears to be the most profitable orchard system. Depending on the type of apple grown, tree spacing is 3’-4’, row spacing 10-11’; this provides 1000-1500 trees per acre. Pruning is prescriptive and limits the amount of vegetative growth in deference to

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7 This number comes from Jeavons’ own calculations: at an intermediate level, 200 square feet can yield over 300 pounds of produce. The average American consumes about this much in fruits and vegetables in a year. See Jeavons, 2006, pg. 3, 23 for more information.
fruit production. There are no permanent branches but a series of “feathers” trained to facilitate maximum production capacity. With mature trees—a Fuji apple, for example—yields are well in excess of 100 bushels per acre, depending on rootstock, while some varieties yield more than 200 bushels per acre; fruit price can be around $5.50/bushel. Fuji apples are a good variety for the Indiana climate and a perennial favorite of consumers. It is important to note than the numbers above were gathered from a non-organic orchard that used chemical inputs to promote production. Because well-tended soil offers greater nutrition for crops, equaling or surpassing these yield numbers does not appear unlikely. Care must simply be taken to ensure that the same composting regimen applied elsewhere on the farm be applied in the orchard as well. This includes visits from the egg-mobile.

- Community gardens: this area supports 34 individual garden plots, each providing 600 square feet. Again, Jeavons’ calculations suggest this could provide enough fruits and/or vegetables for up to 3 adults.

Parking Lot: this area is intended to create an experience of delight for visitors of the farm. The divided sections amount to about 1.1 acres, which will be planted with a mix of corn, beans, pumpkins and nasturtiums. Buckwheat can be planted along edges to create an additional buffer beyond the curb and as a cover crop in the winter; it also feeds the soil and attracts beneficial insects. Other crop combinations include corn, alfalfa, a mix of clovers, rye grass and vetch, oats, and winter rye. These crops will be rotated properly to ensure soil health.
• Trees: there are at least 55 locations for sugar maple, which produce maple syrup from the tree’s sap. Sap quantity is measured per taphole; the number of tapholes depends on tree diameter. The average sap output per taphole is about 15 gallons; favorable conditions can produce 40-80 gallons of sap. It takes about 10 gallons of sap to make one quart of syrup. Therefore, given average conditions, 55 trees with a single taphole each can produce over 80 quarts, or 20 gallons, of maple syrup. Optimizing conditions can significantly increase production.

The site also supports a large number of berry producing trees, such as serviceberry (*Amelanchier spp.*). It is more difficult to determine yield, and much of the production from these trees will support wildlife. While this may not directly benefit human consumers, the indirect and intangible benefits are suggested in the project’s goals.

• Herb/Cut Flowers: this area provides 6,370 square feet for mixed herb, vegetable, fruit and/or cut flower production. Beds are arranged in a keyhole format to maximize growing area and allow easy access for harvest. Bed contents can consist of a mix of perennial and annual species and be planned for a seasonal aesthetic effect.

• Composting: ample space is planned for large compost piles on the north side of the barn and greenhouses. These piles can take material from the farm, as well as individuals and partners.

• Irrigation: slight swales between the field sections empty into an axial swale, which empties into a central reservoir. This reservoir is vegetated to cleanse the water. The water can be pumped back into the fields. Field irrigation is
accomplished through a subsurface drip irrigation system. Proper soil care drastically reduces irrigation demand.

Facilities

- Barn: the barn is 2400 square feet. It houses 400 square feet of cold storage, in addition to equipment and supplies.

- Public market stalls are provided for area producers and garden plot leasees who do not wish to sell directly from their gardens. The individual stalls are part of a 15’x80’ structure, or 8 stalls. Three additional 10x20 stalls are located along the greenhouses to market produce from the farm.

- Primary building: this building located along Michigan Ave. is 5,085 square feet. Building uses are as follows:
  1. Office = 1500 square feet
  2. Indoor market = 1500 square feet
  3. Teaching kitchen = 1000 square feet
  4. Classroom = 885 square feet
  5. Two bathrooms = 200 square feet (total)
• A train platform canopy provides 3,773 square feet of cover

• A 10x20 stall is located at the north edge of the chicken pens. It also serves as a dock for the hen house, which could receive heat at this location in the winter.

• A 1200 square foot shed is located on the east end of the community garden plots to provide extra storage for plot leasees, as well as farm personnel working the fields in the parking lot.

• Each community garden plot contains a small supply shed.

• Parking: 24 spaces, including 2 handicap spaces on the west side of the railroad tracks; another 94 spaces are located in the parking lot on the east side of the tracks; an additional 7 on-street spaces are located on the south side of Michigan St.

Utility lots: 1. adjacent to the barn (2,420 square feet); 2. adjacent to the main public market structure (2,510 square feet).

**Energy Initiatives**

• Biodigester: this equipment is located in the barn. It creates an anaerobic environment that produces (1) methane and (2) compostable solids from materials not suitable for the compost piles. It is difficult to estimate the potential energy production of this unit, but fuel gases could offset greenhouse energy demands. Feed for this process is discussed in Part Two.
• Biodiesel: spent oil is collected from partner restaurants are used to render biodiesel to fuel farm equipment.

• Wind: 9 quietrevolution, ltd. vertical axis wind turbines (see Fig. 15, above) produce 5,000-11,000 kWh/year per turbine.

Public Space

• Recreational lawn: 8300+ square foot turf lawn provides space for public gathering
• Maple grove: 7600+ square foot grove of sugar maple trees with seating benches
• Patio: 8880+ square feet of open patio space with table and chairs and raised seating walls which contain farm crops for sampling (e.g. strawberries, radishes, green beans, etc.)

Transportation & Circulation

• Train: accommodations for Northeast Corridor transit system include aforementioned platform canopy and a 10-20’ wide, 550’+ platform
• Bike lane: 5’ wide, located on the south side of Michigan St., in order to avoid conflicts between bike traffic and vehicles entering the interstate on-ramp.
• Sidewalks: project redevelops 1258 linear feet of sidewalk, including wider walks and buffer strips
• Monon Greenway: project creates 1815 linear foot extension of the greenway. This excludes the space between the existing terminus at 10th St. and St. Claire St.
• Pogue’s Run Trail: project includes this proposed trail for the portion of the stream within the site boundaries

• Pull off: an 18’ wide pull off accommodates drop-off train passengers and quick stops at the market.

Figure 16: Site Circulation

**Stormwater Management**

• Site provides 1.5+ acres of wetland to treat stormwater runoff produced by impermeable surfaces. The wetland on the east end of the parking lot controls the movement of runoff into Pogue’s Run, where a reconstructed bank provides channels for the slowed, cooled and reduced water flow to re-enter the waterway.

• Site provides 1335 linear feet of bioswales to channel water to wetlands
- Porous concrete is used for patio and office building site, utility lots and internal paths.
- Cisterns collect runoff from the following roofs: market stalls, greenhouse market stalls, primary office building, barn and the Midland Art & Antique Mall. This water is reused on crops and/or turf areas adjacent to structures. Runoff from the platform canopy feeds directly into the irrigation reservoir. Excess water can be deposited in wetland areas.

Figure 17: Water Systems

**Conceptual Design**

The design process began with a series of thumbnail sketches which attempted to determine three basic principles upon which design development can expand:
1. Geometry: a basic geometry that responds to the linear qualities imposed by the east-west streets and the north-south railroad but which simultaneously accommodates the significant physical effect of the interstate embankment cutting a shallow diagonal line along the western border of the site; a geometry that also responds to the smaller grids and irregular parcels which mark the character of urban spaces.

2. Connections: these include connections to the Pogue’s Run Trail and the neighborhoods to the northeast; connections across the tracks and across Michigan St.; movement through the site, particularly from production spaces to public spaces; and the introduction of an extension of the Monon Greenway. Also important were the connections between the street and the farm, i.e. how the pedestrian relates to the site.

3. Relationships of land uses: many questions on this subject continued to emerge throughout the design process: how does energy production relate to recreation, a train station to a parking lot, a barn to a greenway, production to a street, etc.

The general direction these thumbnails led is shown in three concepts (Figs. 18-20, below) which amalgamate the better features from the thumbnail process.

**Concept 1**

Here, a drive follows the diagonal established by the interstate. This line in continued by a path which connects the central part of the site with the Monon Greenway through the fields. The same line is then transposed to mark the east side of a reservoir. This concept allows for a strong relationship between the street and the farm, but there
are few opportunities for stormwater management. Massing attempts to step down from the overpass by moving, west-to-east, from overpass to orchard to lower production beds to the almost negative space of the reservoir before the vertical axis is established again with greenhouses.

**Concept 2**

There are few stormwater treatment areas in this concept, and the core of the public market is separated from the street by parking, thus limiting its exposure and interrupting the continuity between the portions of the site on either side of Michigan St. There is also no irrigation reservoir, as in the first concept. More of this concept follows the horizontal geometry established by the railroad than is present in the other concepts: buildings, including the station, and roads in general all adhere to this line. The market
space attempts to create an intimate, closed feel at the expense of a more honest acknowledgement of its location in an urban environment.

**Concept 3**

The orchard in this concept distorts the diagonal imposed by the interstate by transforming the line into a curve, which ultimately defines a point of confluence for several paths. Site uses are more divided here than in the other concepts, and there is no irrigation reservoir. As with concept 2, this plan examines the connections across Michigan St, but the active nodes of the northern portion remains cut off from the southern portion by parking. The station in this concept is in its final location but larger in size and with more diverse uses—a combined station/market/retail unit. Finally, the greenhouses in this iteration are not oriented along the east-west axis in order to maximize exposure along the south side of the structures. While this is not an egregious shortcoming, it is not ideal, either.

**Design Development**

These conceptual ideas were further refined twice. This process helped identify the strongest elements to carry forward, as well as expose the challenges to a successful application of the design principles state above.
Plan 1

Plan 1 maintains site activity near the street but surrenders much of the geometry imposed by the interstate and which helped ease the site into the existing landscape. It provides for stormwater management on both the western edge along the embankment’s ditch, and along the eastern edge of the site where a parking lot for the farm and train station lies nearly adjacent to Pogue’s Run.

There are two primary disadvantages to this plan. First, the building uses at street level are limited to the train platform, which is transitory, and a public market, which is used only periodically (i.e. on weekends). This prevents the site from acquiring an active public presence, which is exacerbated by a lack of flexible public space, and may dull its ultimate impact. More, it fails to really integrate the juxtaposed characteristics of “farm” and “city”.

The second shortcoming of this plan is the lack of a clear logic to site circulation: meandering paths have little cause to their curvilinear form, and more linear paths make awkward turns. Navigation of this site would not be impaired, but greater directness of purpose and simplicity of the form could enhance the pedestrian experience through the
site. More, better circulation logic can create more contact points between urban citizens and this “rural” land use.

**Plan 2**

Plan 2 most closely resembles the final plan, and this description will therefore be brief in lieu of a fuller discussion of the masterplan. Here, a sidewalk presence is firmly established, and the geometry imposed by the interstate is echoed with large strokes at ground level and on a higher plane along a building roof. Ample space is provided for both production and environmental issues like stormwater management. Finally, this plan provides several public spaces, including community garden plots, which had not been conceived in previous design iterations.
Masterplan

The fully rendered final plan for the site is shown in Fig. 42 (App. A). The masterplan for the Back in Mind Urban Farm firmly establishes a transformational atmosphere for the Near East side of Indianapolis. Vacant spaces, whose past uses typify an irresponsible use of land that has degraded the quality of the urban environment, here become part of a verdant pocket that extends branches beyond its boundaries to invite a wide audience. Flexible open spaces create active hubs where the prime mover is an omnipresent sense of production, which itself fuels the activity in and around the site.

The site is noisy, because it lies within an urban core and along an interstate, but also because it produces energy for itself and its neighbors with powerful wind turbines. It buzzes with bees and farm machinery, and the buzz spreads where train passengers from outside the county disembark out of curiosity and subsequently take their impressions with them when they go. The site clicks and clacks from the railroad
tracks, and it clucks with chickens, whose eggs feed the residents of the Near East Side and Mass Ave. restaurant patrons alike.

The design redeems this space by easing the area’s impact on a polluted stream. It re-establishes native plant communities in order to host the birds and bugs which benefit the farm and the wider environment, as well. These same trees help cool the area with shade and filter the air. Finally, the site attempts to redeem the city’s relationship with the area’s residents, by welcoming diverse populations to literally eat the profits of the project and to learn the skills which provide the bounty.

**General Design Considerations**

As mentioned above, the site geometry is initially derived from the form imposed by the dominant interstate presence. The thought that guided this decision was inspired by a basic strategy to counter opposing forces articulated in an ancient text on warfare, Sun
Tzu’s *Art of War*: when pushed, pull; when pulled, push. In this regard, the roughly diagonal line of the interstate pushing into the site is pulled further in—with paths, building lines, the reservoir form, and even across the tracks in the lay of the parking lot and wetland spaces—and it determines the orientation of the 50’ field sections in the main crop fields. An opposing diagonal line opens into the site from the perspective of pedestrians and vehicles, effectively pulling on the push of the one-way, west-bound traffic on Michigan St.

Other site features build off of the linear forms imposed by the railroad and street grid, including a central axis through the main area of site activity. In this way, the site merges and intersects with existing forms and infrastructure, which allows the site to participate in a basic dialogue of urban forms, while the site’s internal form mitigates the bolder strokes created by the interstate. Finally, the reconstruction of the Pogue’s Run bank projects a soft edge onto the community, which offsets the harder edges presented by the Pogue’s Run Trail and the parking lot. These hard surfaces are broken, at any rate, by sections of crop growth and wetlands for stormwater treatment. The relationship between the wetland and the Pogue’s Run Trail atop the reconstructed bank is displayed in Fig. 26.

The following list summarizes other notable features of the general site design:
• Production elements near roadside—patio containers, parking lot fields, herb/flower beds—define site activity and character

• Market stalls for vendors from the public are set within the site, encouraging visitors to move throughout the site

• Trails through productive areas allow through traffic to experience the cycle of birth and death, dissolution to creation, and reinforce this awareness in terms of individual consumption

• Location of runoff controls protects crops and livestock, creates demonstration of practices, water reuse, etc. The movement of water on site is detailed in Fig. 17, above.

• Parking occurs in compartmentalized spaces to reduce mass, create more intimate experience of growing operation, urban food production; also deemphasizes preeminence of parking in the urban environment and allows other modes of transportation to assert a larger role in circulation to and through the site: train, trails and paths.

• Arrivals (train, trail, path) all make immediate contact with production

The layers of the site’s systems are depicted in Fig. 27 (below): water, circulation, production and building footprints. Three elements are immediately evident: the priority placed on production space, the use of separate areas to manage stormwater management (as opposed to a single retention pond), and the effort to create strong north-south and east-west connections. The latter element smoothly transitions pedestrian traffic into the
site from entry nodes and through the site in each direction. In this way, the site can be both destination and a transitory place of delight en route to other ends.

**Farm Operations**

In addition to the production systems described elsewhere, the site design itself facilitates farm activity and public interaction in several key ways.

- Bulky or cluttered activities have dedicated space near the barn and do not interfere with other site uses; visitors can nonetheless interact with farm life as they move freely through the site.

- Main north-south corridor allows the transport of the eggmobile, which can also be pulled onto the area roads to reach field and orchard.

- The herb/flower beds located near Michigan St. consist of a series of 7’ deep beds separated by a narrow hedges and 2.5’ paths. This creates an effect of undulating movement.
into the deeper portions of the site. Visitors walking along the central axis pass through these beds, which projects the dominance of this site function.

- The wide buffer on the south side of Michigan St. protects the chicken pens from traffic and pollution, and it also provides fodder for compost (grasses, alfalfa, winter wheat) and farm production (sugar maples and berry-producing trees).

**Community Assets & Public Spaces**

These spaces—community gardens, recreational lawn and patio—were described in the Program section above. The sequence of these features is also noteworthy.

- The lawn is located at the center of an array of farm functions: the irrigation reservoir, buzzing with the plant and animal communities which populate its waters; the greenhouses with their fish, lettuces, herbs and worms; the wind turbine field, with its energy production and swaying ornamental grasses which fuel spring composting; and the herb/flower production beds, with their seasonal color and welcoming paths.

- The community gardens lie along the primary path from which the neighborhood residents will access the site by foot or bicycle. These are part of the experience for anyone trying to make a train or coming to buy vegetables for the night’s dinner. The garden location also facilitates the transportation of produce from individual gardens to sales point on the main axis of the site.
The patio is situated to accommodate leisure activity that occurs concomitantly with market days but also as part of a commuter’s routine, which stops at the site for coffee and a snack before picking up the next train home. This happens at the street level and with a backdrop of production—flower beds and maple trees, most immediately—which clearly marks the site’s activity to passers-by.

Finally these public areas—the patio and lawn, most notably—can host social gatherings, such as small concerts and local celebrations. Partnering with the Midland Art & Antique Mall provides another opportunity to share audiences and widen the influence of the farm. Tours of the farm can end with the chicken pens and a nod to the mall, which furthers the site’s mission to reuse materials and support the local economy by dealing in local goods. Also, anticipating the development of a fully functional CPUL, parents can combine a trip to the park (Highland Park to the south, for instance) with a stop at the market. In this way, the concept of production is combined with play and the grocery.
Circulation and Access

As mentioned, the site plan accommodates existing proposals for the Pogue’s Run Trail and a bike lane on Michigan St. It also creates an extension of the Monon Greenway, which merges with the train platform in order to control the various forms of movement along this corridor. Travelers of the Monon, then, also have the opportunity to discover the farm quite by accident, and they experience the growing operations along the entire corridor.

Worth noting again, too, is the central axis from which the central activity of the farm is built. It is along this axis that market visitors find vendor stalls and examine the produce from the greenhouses; it connects the public gathering spaces with the flower beds and aids movement across Michigan St. to the chicken pens and the Midland building. Finally, it is the river to the tributary paths that cross the site east-to-west, including the major diagonal path the traverses from the Pogue’s Run Trail, through the...
parking lot, to the central part of the farm. It is important to note that productive elements are found along each of these paths, from the maple trees on the train platform to grape vines in the medians.

Figure 31: The main axis at Michigan St.

**Summary & Conclusion**

This project was conceived as a means of demonstrating how urban design can weave food production into the urban fabric. It is perhaps a too great a leap of our credulity to imagine Indianapolis actually coming around to this sort of land use—and its related costs—in the near future. But the project does address many of the conflicts posed by the complications of modern human settlement. And if the urgency of those conflicts reaches a higher pitch, then this project can serve as a model of how communities can conceive an approach that diminishes some part of the conflict.
This proposal adopts land in a declining neighborhood, where business has all but collapsed, and which is flanked by the challenging presence of an interstate. Rather than allow it to continue to deteriorate and further contribute to the atmosphere of decline that currently besets the area, this proposal plants a seed. The growth of this seed asks the residents of the city to rethink how they get their food, and from where, and what their relationship is to the providers of their food. It asserts the value and primacy of food in our lives, and by extension it demands respect for the land that provides for growth. And if one must respect that land and the process of providing that cycles through that space,

Figure 32: Parking occurs amongst crops, which grow up the sidewalk
then one must consider who put that farm there, and why. Yes, the farm provides, and it instructs, as well, so that the power of providing—the effort, will and skill—is spread throughout a community. The farm attempts to stabilize a miasma and in doing so becomes a testament for the transformation that occurs when basic needs, once relegated to the convenience aisle, are made over into essential sustenance wrought from hands newly freed from the bonds of a broken community on the mend.
The site creates a bridge between communities—those defined by space, race, income, education, and so on. A resident from a Hamilton County suburb, on the way home from work, buys produce grown under the care of a kid from the inner city and never sits down in a car. A wealthy downtown loft resident comes to a weekend market and learns from an ex-con from the Indiana Women’s Prison how the waste from the restaurant on his block provides the goods that will comprise his dinner. And the ex-con could cook it, too, because the restaurant’s chef taught her how. A student from Arsenal Tech, raised on city traffic and sirens, discovers a new world in the stillness experienced husbanding chickens on quiet, early summer mornings. And maybe a recreational trail user is moved by the sense of stewardship emanating from the site and which contributed to the restoration of the stream which the trail follows. So inspired, perhaps she organizes a campaign to restore the entire length of the stream, unintentionally creating the first major extension of the CPUL whose core lies at the Back in Mind Urban Farm.

Figure 33: Production reaches across Michigan St., where structures assembled from salvaged steel bring building features into the landscape
appendix a
Figures 34-42
Fig. 34
Inventory: Site Context

New York St.
oone-way
Vermont St.
twoway
St Claire St.
twoway
Michigan St.
oone-way
Mass Ave.
twoway
College Ave
Midland & Antique Mall
Community garden
Terminus of Monon Greenway & Cultural Trail
10th St.
Arsenal Technical High School
Highland Park
Indiana Women’s Prison
Food Coop
Spades Park
Downtown Indianapolis
Dorman St. is now closed here, and a pedestrian bridge crosses Pogue’s Run

These lots are either vacant or the buildings on them are for lease. This trend is repeated in the residential areas.

Neighborhoods include historic Cottage Home and Woodruff Place, as well as deteriorating areas.
New York St. one-way; community wants two-way

Vermont St. two-way; low volume; truck traffic; relocate business and close it?

St Claire. St. two-way

Michigan St. one-way; community wants two-way; heavy volume due to on-ramp; reroute to Vermont and close for CPUL?

College Ave. continuing greenway to site increases non-vehicular access across the interstate; also connects these populations to the proposed St Claire St. transit station

Downtown Indianapolis

The proposed Pogue’s Run trial would connect the site to the extensive park system that begins with Spades Park here. In this way, passive areas are connected via pedestrian corridors to an urban farm.

Mass Ave. continuing greenway to site increases non-vehicular access across the interstate; also connects these populations to the proposed St Claire St. transit station

Midland offers commercial anchor, established urban clientele

The proposed Northwest Corridor Rapid Transit system will include a station near St. Claire St. Placing it closer to Midland St. takes it out of the ROW but gives the associated activity to the farm and takes advantage of existing development.

Alleys here offer CPUL design opportunity, pedestrian connection to Moss Ave

The proximity of Arsenal Tech creates opportunities for training/internship programs; school is a potential consumer of farm products; relationship can include chef program

The proximity of more affluent residential areas provides a significant client base for the farm; the presence of existing community gardens suggests a positive attitude toward local food.

The women’s prison offers similar opportunities to the high school: training/re-entry programs, chef training, consumers, etc.

Highland Park can represent the southern-most portion of the Near Eastside CPUL; connects via Dorman St. or Pogue’s Run; offers great views to downtown; existing playground; so no need on farm

Node is a key gateway to the community; offers access to Pogue’s Run (CPUL, trail) and pedestrian corridor; stormwater dimension; good location for public/celebration/public art space

Mass Ave Cultural District includes around 37 restaurants that can support the farm via contractual obligations; also attracts likely clientele for farm; major location for pedestrian connections to activate form

Continuing greenway to site increases non-vehicular access across the interstate; also connects these populations to the proposed St Claire St. transit station

Highland Park can represent the southern-most portion of the Near Eastside CPUL, can connect via Dorman St. or Pogue’s Run; offers great views to downtown; existing playground; no need on farm

Community-organized Food coop will offer market outlet for farm. Will farm require an on-site market, as well?

The proximity of more affluent residential areas provides a significant client base for the farm; the presence of existing community gardens suggests a positive attitude toward local food.

The women’s prison offers similar opportunities to the high school: training/re-entry programs, chef training, consumers, etc.

Fig. 35
Analysis: Site Context

not to scale
Fig. 36: Land Use

- 0 - 1.75 Residential Units per Acre
- 1.75 - 3.5 Residential Units per Acre
- 3.5 - 5 Residential Units per Acre
- 5 - 8 Residential Units per Acre
- 8 - 15 Residential Units per Acre
- Over 15 Residential Units per Acre
- Commercial - Office
- Commercial - Retail
- Heavy Commercial
- Downtown Mixed Use
- Vacant
- Agriculture
- Light Industrial
- Heavy Industrial
- Hospital
- Schools
- Cemeteries
- Churches
- Utility
- Special Use Other
- Railroad Row
- ROW
- Park
- Major Water Bodies
- Unknown
- Developing
- Parking lot
- Parking Garage
Fig. 37: Site Images
Images here are from the Midland Art & Antique Mall lot. The map provides the location from which the shots were taken.
Fig. 38: Site Images

Images here are from the area north of the antique mall. The map provides the location from which the shots were taken.
Fig. 39: Proximity Map

[Map showing various circles with labels such as 1/4 mile radius, 1/2 mile radius, 1 mile radius, and 2 mile radius, along with key locations like Cultural District, Park System, Food Coop, Downtown, Women's Prison, High School, Monon Greenway.]
Site Inventory

Significant features within and surrounding the site boundaries.

- Vacant lot; several buildings of poor quality; abuts Pogue’s Run; paved; accessed from Michigan St.
- Area includes cell tower; buried fiber optics at north end; significant other equipment; lot is weedy overgrowth and fenced with chainlink; some concrete rubble
- Zone is vacant/for lease; industrial past; several structures of poor quality; lot adjacent to tracks has loading dock; mostly paved, though broken with weeds
- Building is for lease; chemical production facility with loading dock for tractor-trailers
- This zone has several owners; lot that abuts Michigan contains a residential trailer; surface is mostly grass, weeds toward north; highway on-ramp begins at grade
- Midland lot; this area is a gravel parking lot with no obvious organization and contains several outbuildings; access is from Vermont and Michigan; loading dock on south side of building
- Midland lot; undeveloped with a turf cover; chainlink fence surrounds lot; weeds/trees between railroad and turf area; swale cut in arc through center of east portion
- Building is for lease; chemical production facility with loading dock for tractor-trailers
- This zone has several owners; lot that abuts Michigan contains a residential trailer; surface is mostly grass, weeds toward north; highway on-ramp begins at grade
- Embankment is turf, 14+ feet; no significant shadow cast during growing season; stormwater pipes near bottom of embankment
- Window/door company; business is moving, space for lease; 58k sq. ft. under roof; deteriorating outdoor area/structures on northeast corner of lot
- Orange dashed line indicates active businesses, predominantly shipping/distribution-oriented
- Location of new pedestrian bridge; Dorman St. closed to vehicular traffic; lots are fenced off; feral dog pack?
Significant opportunities and constraints within and surrounding the site boundaries

Main area for crops (south of cell tower); if trail comes through, consider interface with farm activity; must maintain access to equipment; views are to Marian's fence; stormwater pipes may impact development

Suitable space for wetlands; grade is raised above rest of site (reuse fill); use ditch for overflow; trees to filter road pollution

Relationship to Midland is key; structures at northeast block access; parking to be retained; improved; stormwater measures; sidewalks around building are narrow

Embankment poor for crops due to polluted stormwater; could be used for cut flower production, naturalization, wind turbines

Proximity to Highland Park obviates need for similar features on site; helps form key node on a potential CPUL chain

Fig. 41 Site Analysis

## Temperate Climate, North American, Midwestern Species

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canopy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beech</td>
<td><em>Fagus grandifolia</em></td>
<td>Nuts</td>
</tr>
<tr>
<td>Butternut</td>
<td><em>Juglans cinerea</em></td>
<td>Nuts</td>
</tr>
<tr>
<td>Shagbark Hickory</td>
<td><em>Carya ovata</em></td>
<td>Nuts</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td><em>Acer saccharum</em></td>
<td>Syrup</td>
</tr>
<tr>
<td>White Oak</td>
<td><em>Quercus alba</em></td>
<td>Nuts</td>
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<tr>
<td><strong>Understory</strong></td>
<td></td>
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</tr>
<tr>
<td>American Persimmon</td>
<td><em>Diospyros virginiana</em></td>
<td>Fruit</td>
</tr>
<tr>
<td>Apple</td>
<td><em>Malus pumila</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Cherry</td>
<td><em>Prunus spp.</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Cornelian Cherry</td>
<td><em>Cornus mas</em></td>
<td>Fruit</td>
</tr>
<tr>
<td>Crabapple</td>
<td><em>Malus spp.</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Hazelnut</td>
<td><em>Corylus spp.</em></td>
<td>Nuts</td>
</tr>
<tr>
<td>Kentucky Coffee Tree</td>
<td><em>Gymnocladus dioica</em></td>
<td>N-fixer</td>
</tr>
<tr>
<td>Paw Paw</td>
<td><em>Asimina triloba</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Pear</td>
<td><em>Pyrus communis</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Plum</td>
<td><em>Prunus domestica</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Serviceberry</td>
<td><em>Amelanchier spp.</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Witch Hazel</td>
<td><em>Hamamelis virginiana</em></td>
<td>Medicinal, flowers</td>
</tr>
<tr>
<td><strong>Shrub Layer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackberry</td>
<td><em>Rubus occidentalis</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Currant</td>
<td><em>Ribes sativum</em></td>
<td>Fruit</td>
</tr>
<tr>
<td>Elderberry</td>
<td><em>Sambucas nigra</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>False indigo</td>
<td><em>Baptisia australis</em></td>
<td>N-fixer</td>
</tr>
<tr>
<td>Gooseberry</td>
<td><em>Ribes uva-crispa</em></td>
<td>Fruit</td>
</tr>
<tr>
<td>Raspberry</td>
<td><em>Rubus idaeus</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Rose</td>
<td><em>Rosa spp.</em></td>
<td>Medicinal, flowers</td>
</tr>
<tr>
<td>Siberian Pea Shrub</td>
<td><em>Caragana arborescens</em></td>
<td>N-fixer, flowers</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Herbaceous layer</th>
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<tbody>
<tr>
<td>Arugula</td>
<td><em>Eruca vesicaria</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Chamomile</td>
<td><em>Chamaemelum nobile</em></td>
<td>Tea, flowers</td>
</tr>
<tr>
<td>Chives</td>
<td><em>Allium schoenoprasum</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Comfrey</td>
<td><em>Symphytum uplandicum</em></td>
<td>Medicinal, mulch</td>
</tr>
<tr>
<td>Cornsalad</td>
<td><em>Valerianella locusta</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Dill</td>
<td><em>Anethum graveolens</em></td>
<td>Edible, insectary</td>
</tr>
<tr>
<td>Fennel</td>
<td><em>Foeniculum vulgare</em></td>
<td>Edible, insectary</td>
</tr>
<tr>
<td>Garlic</td>
<td><em>Allium sativum</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Kale</td>
<td><em>Brassica oleracea</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Lemon balm</td>
<td><em>Melissa officinalis</em></td>
<td>Tea</td>
</tr>
<tr>
<td>Lettuce</td>
<td><em>Latuca sativa</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Lovage</td>
<td><em>Levisticum officinale</em></td>
<td>Edible</td>
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<tr>
<td>Mint</td>
<td><em>Mentha spp.</em></td>
<td>Edible</td>
</tr>
<tr>
<td>New Zealand Spinach</td>
<td><em>Tetragonia expansa</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Onion</td>
<td><em>Allium cepa</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Parsley</td>
<td><em>Petroselinum crispum</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Rhubarb</td>
<td><em>Rheum rhabarbarum</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Salad burnet</td>
<td><em>Sanguisorba minor</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Sorrel</td>
<td><em>Rumex scutatus</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Spinach</td>
<td><em>Spinacea oleracea</em></td>
<td>Edible</td>
</tr>
<tr>
<td>Stinging Nettle</td>
<td><em>Urtica dioica</em></td>
<td>Edible, mulch</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flowering Ground Covers</th>
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</thead>
<tbody>
<tr>
<td>Strawberry</td>
<td><em>Fragaria spp.</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Nasturtium</td>
<td><em>Tropaeolum minus</em></td>
<td>Edible flowers</td>
</tr>
<tr>
<td>Violet</td>
<td><em>Viola spp.</em></td>
<td>Edible flowers</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vines</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape</td>
<td><em>Vitis vinifera</em></td>
<td>Fruit</td>
</tr>
<tr>
<td>Hardy Kiwi</td>
<td><em>Actinidia arguta</em></td>
<td>Fruit, flowers</td>
</tr>
<tr>
<td>Hops</td>
<td><em>Humulus lupulus</em></td>
<td>Medicinal</td>
</tr>
<tr>
<td>Scarlet Runner Bean</td>
<td><em>Phaseolus coccineus</em></td>
<td>Edible, N-fixner, flowers</td>
</tr>
<tr>
<td>Wisteria</td>
<td><em>Wisteria floribunda</em></td>
<td>N-fixner, flowers</td>
</tr>
</tbody>
</table>
appends c c

crop rotation guidelines

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1 “One Straw: Be the Change.” http://onestraw.wordpress.com/sub-acre-ag/1-acre-market-garden-rotation/