WINDSOR VILLAGE REVITALIZATION:

URBAN AGRICULTURE TAKES ROOT

A CREATIVE PROJECT

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JOSEPH E. BROCKMEYER

PROFESSOR MARTHA HUNT, CHAIRPERSON

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>i</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>v</td>
</tr>
<tr>
<td>Chapter 1 – INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Chapter 2 – EXPLORATION OF TOPICS &amp; CASE STUDIES</td>
<td>13</td>
</tr>
<tr>
<td>Chapter 3 – SITE INVENTORY &amp; ANALYSIS</td>
<td>64</td>
</tr>
<tr>
<td>Chapter 4 – GOALS &amp; OBJECTIVES AND PROGRAMMING</td>
<td>83</td>
</tr>
<tr>
<td>Chapter 5 – DESIGN</td>
<td>90</td>
</tr>
<tr>
<td>Chapter 6 – CONCLUSIONS &amp; RECOMMENDATIONS</td>
<td>129</td>
</tr>
<tr>
<td>WORKS CITED</td>
<td>134</td>
</tr>
<tr>
<td>APPENDIX A – Windsor Village Information Brochure</td>
<td>141</td>
</tr>
<tr>
<td>APPENDIX B – Best Management Practices Report</td>
<td>143</td>
</tr>
<tr>
<td>APPENDIX C – Vegetable Families Fact Sheet</td>
<td>154</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1 – An Example of Urban Farming in Havana, Cuba (Levenston).................................17
Figure 2 – Fenway Victory Gardens, Boston, MA (Siteman)...................................................31
Figure 3 – Harvest at Earthworks Community Garden in Detroit, Michigan (Kitchen)...........33
Figure 4 – 50 Cent Community Garden Site Plan by Walter Hood (Gorgolewski, 71)..............52
Figure 5 – View of the Garden (Gorgolewski, 70)........................................................................52
Figure 6 – Stormwater collector and details (Gorgolewski, 71)......................................................53
Figure 7 – Site Plan for Village Homes (Chapin, 125)...............................................................60
Figure 8 – Community Commons Plan (Chapin, 127)............................................................61
Figure 9 – Pathways through common areas in Village Homes (Chapin, 126)............................62
Figure 10 – Site Location.................................................................................................................65
Figure 11 – Community Context Inventory..................................................................................70
Figure 12 – Windsor Village Park Site Plan (Department)..........................................................71
Figure 13 – Survey of area based on site visit..............................................................................71
Figure 14 – Aerial Image from 1956 of Windsor Village Neighborhood.....................................72
Figure 15 – Aerial Image of Windsor Village neighborhood area before development (GIS)....72
Figure 16 – Foreclosure map shows homes foreclosed between 2007 and 2009.......................73
Figure 17 – Vacant Parcels in Windsor Village.............................................................................74
Figure 18 – Indy Go Bus Stops located in Census Tract...............................................................75
Figure 19 – Topography and Floodplain in Census Tract..............................................................76
Figure 20 – Figure-Ground Study of the Census Tract...............................................................77
Figure 21 – Neighborhood Circulation Map……………………………………………………………………………….78
Figure 22 – Food Desert Map 1…………………………………………………………………………………………………79
Figure 23 – Food Desert Map 2…………………………………………………………………………………………………79
Figure 24 – Soil Inventory (Service)..................................................................................................................80
Figure 25 – Site Analysis.....................................................................................................................................82
Figure 26 – Design Process Thinking...................................................................................................................91
Figure 27 – Programming in Response to Needs of Community.................................................................92
Figure 28 – Farm & Garden Education Opportunities.....................................................................................93
Figure 29 – Conceptual Drawing # 1.....................................................................................................................95
Figure 30 – Conceptual Drawing # 2.....................................................................................................................95
Figure 31 – Conceptual Drawing # 3.....................................................................................................................96
Figure 32 – Conceptual Drawing # 4.....................................................................................................................97
Figure 33 – Food Diagram.................................................................................................................................99
Figure 34 – Compost Diagram..........................................................................................................................100
Figure 35 – Energy Diagram.............................................................................................................................101
Figure 36 – Water Diagram...............................................................................................................................102
Figure 37 – Windsor Village Agri-park Master Plan ......................................................................................104
Figure 38 – Enlargement plan of outdoor patio and kitchen..........................................................................105
Figure 39 – Enlargement plan of Educational Garden Center........................................................................106
Figure 40 – Site Diagrams of Productive Spaces .............................................................................................115
Figure 41 – Site Diagrams of Hardscaping and Existing Vegetation..............................................................116
Figure 42 – Year-Round Production Chart
Figure 43 – View of the Entrance to Windsor Village Park
Figure 44 – Perspective of Outdoor Kitchen and Patio during a summer harvest celebration
Figure 45 – Section of Orchard and Artwork
Figure 46 – View of Green Billboard from Interstate 70
Figure 47 – Section from I-70 to the Basketball Court
Figure 48 – Section of Edible Play Area looking North
Figure 49 – Perspective of Farmer at work near mobile chicken coop
Figure 50 – Potential UA Intervention Sites
Figure 51 – Windsor Village Fact Sheet
Figure 52 – Vegetable Families (Vegetables Only)
CHAPTER 1

INTRODUCTION

The design of a park for a community in Windsor Village, Indianapolis, Indiana is a response to the needs of the community members for access to fresh foods and exercise in order to increase health and revitalize a community. The neighborhood is still struggling after a mortgage fraud crisis that resulted in the FBI arrests of seven individuals who arranged 149 fraudulent loans through Countrywide Home Loans from 2003-2005. The value of the loans was estimated at $19.7 million (U.S. Attorney's Office). As a result, there have been over 100 house foreclosures in the Windsor Village Neighborhood between 2007 and 2009 (as shown in Figure 16, found on page 73). Though the mortgage crisis has hurt this community, it has provided an opportunity for an urban agricultural intervention in lots that are now vacant. The neighborhood is also located within a food desert, meaning it lacks a grocery store within 1 mile of 33% of the
census tract’s population (USDA, Food Desert Locator). This creates a problem of access to nutritious foods that help to make healthy communities.

It is essential to balance a food system that has become over-industrialized with a local food production system capable of offsetting incomes and providing nutritional value. The increasing human population and the reality of food and water shortages make it imperative to find alternative means of healthy food production within urban communities and to help those residents work together towards a sustainable future. The urban agriculture movement provides a redevelopment opportunity that will spur community and park development in providing greater community health.

Research shows that communities in Indianapolis, and everywhere in America for that matter, are struggling to eat healthily. Food in the grocery store often travels more than 1500 miles (Kenner) to get to its destination, and the amount of pesticides, fertilizers and oil used in the process is doing significant damage to our ecological systems’ health. The effects have been a steady increase in obesity rates, diabetes and lack of attention in school due to lack of proper nutrition and the inability of many in low-income neighborhoods to have access to these foods. Studies have shown that fast-food restaurants are more likely to be located in minority communities that are lower income and while they may provide more calories overall, the lack of nutritional value has helped spur this obesity epidemic in America (Sallis).
The concepts of community health design and urban agriculture drive the idea of a community response to a health and food crisis. Research supports the assumption that greater access to healthy food alternatives will help to create better food choice behaviors. This, in turn, will create a healthier community overall while allowing for greater social interaction that will increase community health as a whole (decreasing crime and increasing interactions among residents). The built environment provides countless possibilities for food productivity and this study explores how best to integrate them.

As a large part of the built environment, parks and neighborhoods have the opportunity to play a large role in increasing the health of the Windsor Village Community. Park design has traditionally been about programming for recreation and sport with little attention to how a park might affect the health of all constituents in a community. Urban agriculture has the ability to impact the health of all neighborhood residents who utilize the park, regardless of age, race or gender because it allows for all to participate actively. The same is true for community design. The introduction of edible streetscapes and community gardens has the ability to revitalize a community by stimulating the local economy and encouraging social cohesion through gardening/farming and education.

Education must play a role in helping to alleviate health crises caused by an inefficient food system that favors wealthier Americans. In conjunction with greater urban agricultural design, one must educate youths and adults alike about the
nutritional benefits of such a plan and how one can instill a sense of stewardship of
these urban food environments. Without education, the design would be meaningless
as few people would know which fruit trees are edible or how to tend a garden and
cook certain vegetables. Urban agriculture is a kinesthetic teaching tool for science,
math, nutrition and health.

Finally, traditional and nontraditional forms of urban agriculture are explored.
Urban agriculture is found everywhere from rooftops and window pots to schools,
hotels, restaurants and prisons. Community gardens and Community Supported
Agriculture (CSA) continue to grow in the United States as the local food movement
responds to the stresses of our current food system. The components that contribute to
productive landscapes; aquaponics, hydroponics, vertical gardening, organic gardening
techniques and others are examined. Urban agriculture, when properly integrated with
community and park design creates a more nutritious food environment that educates
citizens, thereby increasing community health. Growing Power, an organization that
operates in Milwaukee and Chicago, is an example of an urban agricultural non-profit
that has successfully educated youths and hired many of them to work their farms and
aquaponics warehouses.

The research conducted for this project contributed to the development of the
program, goals, and objectives. It also affirmed that Windsor Village Park and
community is in need of revitalization and an alternative design that encourages
community health, education, economic growth and nutritious food to help sustain this
community and make it a vibrant destination for Indiana foodies, locavores and citizenry.

PROJECT SIGNIFICANCE

The field of landscape architecture is at a moment where it can play a much larger role in the planning of communities and urban settings. The urban agriculture movement in the United States has a long history of appearing during times of hardship or war, then slowly disappearing when the economy does well. Increasing food prices and ecological costs of industrial food production make it clear that landscape architects have much to offer in designing urban landscapes that reconnect urbanites to nature and their food source in a sustainable manner. Food has brought people together for thousands of years and we can relearn how to harvest its full potential to create healthier urban communities (socially, environmentally and economically).

Marion County, situated in the center of Indiana and home to the state capital, Indianapolis, is still struggling to provide all its citizens with proper nutrition. Reports from the Indiana State department of health state that 9.6% (or 455,000) of the adult population reported that they have been diagnosed with diabetes (the national average is 8.2%). Furthermore, it is estimated that 4.0% (or 253,434) of the adult population have undiagnosed diabetes. Diabetes was the 7th leading cause of death in Indiana in 2006 (4th leading cause for African Americans, 7th for whites and 6th among Hispanics).
Indiana’s state obesity rate is 29.6% with the estimated medically related costs at around $1.63 billion dollars (Prevention, U.S. Obesity Trends). According to statistics from the same organization, the National Conference of State Legislatures, Indiana’s childhood obesity rate was 29.9% in 2007. The Centers for Disease Control and Prevention also noted that 75% of American high school students “do not eat the recommended servings of fruits and vegetables each day”. And over the past 40 years, obesity rates for children and adolescents ages 6 to 19 nearly tripled (Prevention, U.S. Obesity Trends). Further, according to the USDA food atlas, 5.34% of the Marion county household population has low income and resides at a distance greater than 1 mile to a grocery store. These statistics all show the need for action in the area of community health (USDA, Food Environment Atlas). Case studies of cities such as Buffalo, Philadelphia and Detroit in the U.S. and Havana, Cuba show that urban agriculture does make a difference in helping to alleviate our current food and economic crises.

The parks departments in U.S. cities have a great opportunity to play a role in spreading urban agriculture throughout their lands as a way to help revitalize impoverished communities and engage more citizens in the use of park spaces. Indianapolis alone has over 11,000 acres within Marion County under their purview. This vast amount of land provides opportunities for crop production that will engage diverse groups of people in a process of production and maintenance that will enhance the local nutrition environment, supplement incomes and provide greater social interaction. However, during the recession, the parks department has cut its staff down
to just over 250 employees (with more hired seasonally in the summer) making it much harder to successfully manage their vast land bank. Therefore, it is important that parks departments examine decision making models related to the integration of urban agriculture into park planning and design. These models can serve to ensure that the positive effects from urban agriculture have lasting impacts on a community.

DEFINITION OF PROBLEM, SUBPROBLEMS & HYPOTHESIS

There is a disconnect between good design, urban agriculture and sustainable, and pedestrian-friendly transportation. The city of Indianapolis is working to alleviate health and wellness issues in certain communities through the introduction of urban farms, greenways, community gardens in parks and trail systems. This study examines how parks, streets and transportation systems can be more conducive to solving the problems that currently trouble Indianapolis including obesity, food deserts and diabetes. It provides Indianapolis a neighborhood example exhibiting how strong, well-designed connections between people and their food sources will promote a healthier lifestyle.

Problem

How do we design Windsor Village community and park to promote community connections and access to healthy food choices, educating citizens about these choices
and provide supportive transportation systems that promote health as a way to revitalize this impoverished community?

Subproblems

- Identify characteristics of a healthy community
- Identify characteristics of urban agriculture that foster behavioral change in relation to food
  - Aspects of the built environment that can influence behavioral change are many and include different space typologies, processes and programs.
- Identify the characteristics and design approaches of traditional park and community design
- Identify characteristics of sustainable organic intensive agriculture
- Identify aspects of urban agriculture that can play a large role in educating youths and adults
- Apply findings from above to the design of Windsor Village
DELIMITATIONS & ASSUMPTIONS

Delimitations

1. Soil remediation techniques will be mentioned, but a remediation plan will not be created
2. The design is conceptual in nature and not expected to be built
3. Research will not focus on the physical growing practices of crops
4. This study will not supply all the food for the neighborhood but will help to supplement their income and nutritional intake by attempting to provide 10% of their fruit and vegetable needs
5. While education implementation will be a part of this project, examining how one designs for education will not be part

Assumptions

1. The neighborhood residents and city officials are in agreement with the design of the Windsor Village Park
2. All food produced in the park and on the streets will be grown organically
3. All land rights and ownership issues are settled
4. That urban agriculture is a successful environmental design solution that enhances community and economic growth.
5. Soil on site will be remediated after conceptual ideas are in place
6. Urban Agriculture, Park Design, Community design and environmental education are compatible concepts.

METHODOLOGY

Many methods of research were used in this project. The qualitative research included interviews, articles and books that support the hypothesis laid out prior to beginning the work. The second method was the collection of quantitative data which
was also done through articles, books and websites and showed the extent of the problems affecting our food industries and in the end, our community health. The research included site visits and conceptual development for new park designs. The conceptual design revealed more opportunities for interventions, as well as the limitations of what the design can do. These methods were refined with the help of the committee and led to a final design product that illustrates a new way of integrating urban agriculture into park and community design.

Qualitatively, the use of interviews and time spent in the community were the main tools of data collection. The information gathered helped to understand the changes felt by different groups affected by the urban agricultural intervention (students, parents, administrators, IU Medical, Gleaner’s food bank and neighborhood residents). The area’s youth’s current relationship to food was also examined. It was important to interview the community center managers to gather data about the students’ current relationship to food to be used as baseline data. Research examined how the built environment can affect our food choices and responses to such crises in communities similar to Windsor Village.

Quantitative data was gathered in spreadsheets, diagrams and charts that help to more easily visualize what the issues are on the site and for the users. Searching for common themes and issues in each interview and cross-analysis of the interviews to find the parallels were integral to finding the most important issues affecting the people in these neighborhoods. The common threads identified among the different user
groups led to a greater understanding of the client needs and helped to determine whether the park and community is capable of responding to those needs. The aesthetic data was analyzed with the assistance of the committee of two landscape architects and an urban planner, and peers through many design critiques.

Finally, these data sets were used to define the needs of the users within these urban communities and develop programming which drive the design concepts. The evidence in the literature is used to create forms that maximize the potential of the site to be an aesthetically pleasing, evidence-based design. The design concepts serve as the data and with the help of the committee and outside critics; they have led to a stronger understanding of the site and its needs, as well as those of the community at large. In this stage, the visual character of the site was examined and ideas were gathered which created a design language for use in the representations of the design.

The final step in this process was the design synthesis which integrated the research, interviews and conceptual development into a final submission. It started with site analysis and inventory which helped to develop and define the project’s goals and objectives. Once these were established, programming was proposed that responded to the needs of the community. The qualitative and quantitative research was utilized to create conceptual designs that began abstractly and ended with the smallest detail. Once the design was complete, final documentation commenced and the resulting document is a representation of the design and its objectives.
The final product is a synthesis of the findings into a creative project that includes design concepts, data sets, and analysis of many interviews and the literature. It draws conclusions about how effective an urban agricultural intervention can be in an impoverished neighborhood in Indianapolis. The intent of this research is to provide Indy Parks and other urban parks departments the impetus to open more space to urban organic farms as an effective way to build community health and wellness and create food awareness and education.

Definitions

**Food Desert** - The USDA defines a food desert as “a low-income census tract where a substantial number or share of residents has low access to a supermarket or large grocery store” (USDA, Food Desert Locator).

**Food Security** - The Community Food Security Coalition defines it as “a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice” (Hodgson 7).

Community Supported Agriculture (CSA) – a type of farm share system where neighborhood residents all subscribe to a certain farmstead in exchange for fresh produce and meats every few weeks.
CHAPTER 2

BACKGROUND

FOOD SYSTEMS

In his “Positions to be examined concerning National Wealth,” [Benjamin] Franklin listed in 1769 the three ways by which a nation might acquire wealth, and gave his opinion on each: “The first is by War...This is Robbery. The second by Commerce which is generally Cheating. The third by Agriculture the only honest Way.” (Wulf 5)

Agriculture and farming have been a way of life for Americans for hundreds of years.

The American colonies, in their effort to start a manufacturing sector (America was Britain’s largest export market), were hampered by the British laws and regulations. As a result, the colonists utilized the greatest resource America had to offer: fertile soil to grow crops. Benjamin Franklin thought that this resource was enough to make America “self-sufficient” without the luxury goods that were currently imported from
Britain. Andrea Wulf, the author of *Founding Gardeners*, states that the founding fathers believed that “Agriculture and the independent small-scale farmer were, in their eyes, the building blocks of a new nation.”(10). It was the fertility of American soil that pushed the founders to believe that this country was strong enough to stand on its own.

It is interesting to note that the environmental movement started with the founding fathers, and not Henry David Thoreau or John Muir. James Madison believed that one must learn to live within the “symmetry of nature” and thus keep balanced ecosystems.

Although the founding fathers believed an agrarian path was America’s way to prosperity, it is unlikely that they would have predicted the type of industrial agriculture that exists today.

America was a country of farmers during its infancy. Most of the founding fathers and many of the first presidents had vegetable gardens that they designed and often helped to maintain while the majority of countrymen were small, homestead farmers (Wulf 10). This is in great contrast to our current system of production, which has drastically reduced the number of agricultural laborers. According to Eric Millstone and Tim Lang in *The Atlas of Food*, less than 10% of Americans work on farms, which is true in most of the developed areas of the world (Millstone). This disconnection between production and food on the dinner table has created a society that does not understand what it means to live within the “symmetry of nature.” Agriculture is a crucial way of understanding and connecting with our environment. Society must nurture earth’s ecosystems and habitats as the earth nourishes our bodies with food.
The growth of agribusiness has been in conjunction with the discovery of fossil fuels, pesticides and fertilizers as well as the machinery created by the Industrial Revolution. These industrial practices took away many of the farming jobs available. The machinery allowed one farmer to grow crops on a much larger scale and has steadily led to the downfall of the small homestead farmer in America. The rising cost of oil has had a devastating effect on the price of food and the efficiency of industrial agriculture (Nordahl). In 1940, 1 calorie of fossil fuel produced 2.3 calories of food energy. In 2009, it took 10 calories of fossil fuel to produce only 1 calorie food energy. The input costs of farming are at an unsustainable level as fossil fuel is a finite resource. From June 2010 until February 2011, the World Bank estimates that rising food prices caused 44 million more people to slip into poverty (News).

The rising cost of food disproportionately affects the poor as over half of their income will be spent on food. This is unconscionable in a time when wealthier Americans have over 3500 calories available to them every day (Millstone 19). This food crisis has created an out of balance ecosystem that relies too much upon fossil fuels and chemicals that have devastating consequences for the environment that sustains society.

Many countries, states and cities have been faced with food shortages in the past 20 years, but none as great as Cuba faced. Havana, Cuba became a breeding ground for experiments in urban agriculture that help to sustain an urban population to this day. Food availability in Havana dropped by 60% between 1991 and 1995 because
of the fall of the Soviet Union; this resulted in the loss of cheap fuels and agricultural imports which led to a food shortage. At the same time, a U.S. embargo of Cuba was implemented. In response, Cuba, which was no longer able to distribute food to its entire population, began to develop an *autoconsumo* plan that was meant to increase “local food self-sufficiency.” (Novo 330). This led to a reduced need for refrigeration, storage and transport which is resource-demanding. Using an organic, intensive method, urban farmers in Cuba currently produce 58% of Cuba’s vegetables and farms comprise 41% of the city area (Millstone, 54). Until September of 1993, Cuba had grown almost all of their crops on large, state run farms. They broke these into small collectives which are owned and operated by the local citizenry (Novo).

Although the Cuban government continued to operate its state food distribution system, the farmers’ surplus was now able to be sold at farmer’s markets. The strong government support was essential to creating an established urban agriculture network that has moved the production system from chemical based to organic. Mario Novo and Catherine Murphy describe Havana as “the world’s first co-ordinated urban agriculture programme, integrating: 1) access to land; 2) extension services; 3) research and technology development; 4) new supply stores for small farmers; and 5) new marketing schemes and organization for selling points for urban producers.” (Novo 333). These 5 aspects of the program helped to create a system that continues to last after the end of the “special period”, as the food crisis period in Cuba was named. Land use rights are essential to creating productive urban landscapes and the Cuban government created
an Urban Agriculture Department which worked to give legal priority for unused space to citizens who wanted to farm it.

There are 5 different types of farms within Havana (See Figure 1 for an example). There are popular gardens, which are found in yards and on balconies and rooftops which directly nourish local families. Often the food is donated to local schools and daycares as the land used to grow the food is often not the farmers’ own. There are over 26,000 popular gardens which produce over 25,000 tons of food each year (Novo 335). The second type of farm is a basic co-operative production unit, which include portions of former state farms and usually contain 5-10 members. The third type is a farm of the State Co-Operative Supply Unit which is located next to factories and supply food to the work cafeteria.

The fourth type is a traditional, individual farm which averages in size around 13 hectares. Finally, state farms still exist to help provide food at reasonable prices and are found in the peri-urban setting. These different farm typologies support a localized food system that offsets the loss of food due to political, economic and social circumstances.
Havana’s new food system that relies primarily on urban agriculture does not come without its own challenges. Water supply is one of the most difficult issues for Havana’s gardens. Soil is also a major challenge as there is hardened soil full of gravel throughout the city. There was a lack of diversity in crops before this food crisis and the introduction of urban agriculture, and, in particular, popular gardens, has led to a renewed diversification with local seed-saving. Though the challenges for Cubans in Havana were great, this government supported strategy has had a lasting impact by creating urban farms that continue to increase in size and number. The reduction of transportation time and cost has made food much less expensive and it is estimated that urban farmers sell their produce at prices that are 20% less expensive than mainstream prices (Novo, 344). The neighborhood gardens and popular gardens have increased social cohesion in Havana, as well. Employment opportunities abound in this system and the Cuban government “estimates that 117,000 people work in urban agriculture and 26,426 workers are employed in jobs related to urban agriculture.” (Novo 344) Urban farmers’ incomes are often higher than the national average salary in Cuba.

Havana’s farmers and inhabitants were not the only beneficiaries of this urban agriculture program. Chemicals were banned and biological control methods for pests and crop diseases were implemented instead. Zoning plans allowed for urban animal husbandry in areas that were less ecologically fragile (far from water sources, for example). The Cubans have also initiated a compost system that utilizes animal waste,
reducing the overall waste of the population and creating a more sustainable system. The benefits of the urban agricultural program in Havana have made a lasting impact on food production in Cuba.

The U.S. has not witnessed a food shortage like the case study of Havana, but their experiences can provide one with much insight into the mitigation of distribution shortages and contaminations that arise from the current system of production. Not only is there an issue of environmental health related to our food system, but community and individual health is dependent on many food-related factors. Hunger, obesity and diabetes are directly related to problems that currently exist in our food system. Students and adults alike who do not have access to fresh, healthy food every day are more likely to eat processed foods that are high in fat, often in the form of fast food. This leads to increases in diseases and results in higher health care costs. There is increasing evidence of greater numbers of food deserts in the urban community. The access to nutritious, affordable and safe food on a daily basis is the concept of food security (Nordahl 5). Food security is essential to creating healthy, cohesive communities that can compensate for a food desert through their commitment to local urban agriculture.

A centralized food system impacts the public health by an increase in contaminations and foodborne illnesses. Darrin Nordahl states that small, local farms are less likely to have a negative impact on people because the larger geographic distribution of food is the main risk associated with food contaminations. He explains
how the current system has endangered the American people and the environment by planting crop monocultures in several states (Florida and California to name a few). These tracts of land are becoming increasingly susceptible to pests, disease and climactic factors as genetically modified plants are used more expansively and climate change continues to wipe out whole crops. One example of the current system endangering human health is of an E.Coli outbreak in 2004 that contaminated spinach and originated from one processor in San Juan Bautista, California. This episode sickened over 200 people in 26 states in less than 2 months (Nordahl).

The environmental impact of the centralized food system is also felt through the use of synthetic pesticides and fertilizers. These not only contribute to greenhouse gases because fossil fuels are necessary to their production, but their application to plants is often the cause of cancer or birth defects in farm workers’ and their children and could even sicken a consumer. The use of agrichemicals is related to economics. Meant to increase farm yields and increase profits, the chemicals do more harm than good (Nordahl). Public gardens are usually not concerned with large yields and therefore, fewer chemical fertilizers will be used in urban farm management.

The globalized food supply and the seemingly endless transport of produce is a risky venture that can be mitigated with a more localized food source. The increased threat of bioterrorism in our globalized age is a very real possibility. Michael Pollan explains this risk in scary terms, “When a single factory is grinding 20 million hamburger patties in a week or washing 25 million servings of salad, a single terrorist armed with a
canister of toxins can, at a stroke, poison millions” (Nordahl 31). This is a very serious concern when the Food and Drug Administration, the government agency tasked with protecting our food supply, is unable to even inspect 2% of the food production facilities in America in a single year (Nordahl 31). 700 FDA workers are responsible for overseeing “30,000 food manufacturers and processors, 20,000 warehouses, 785,000 commercial and institutional food establishments, 128,000 grocery and convenience stores, and 1.5 million vending operations” (Nordahl 30). This does not include imports from other countries that must be inspected, as well. Serious changes to the current central distribution system should be considered in anticipation of problems arising from its potentially destructive nature.

An equitable food system in America is unachievable with the current economic, environmental and health impacts of our production system. Nordahl argues that Americans are just now understanding that “food security is economic security is national security” (Nordahl 16). This means that securing the American food supply is essential to a prosperous and safe future. He states that healthful food alternatives must be present in the urban environment to stand in contrast to fast and processed food choices which dominate the centralized system. Sustenance and nutrition must become part of our urban landscapes (Nordahl 7). If the challenges of current food system practices are not met, the negative environmental, economic, social and physical health impacts will continue to grow.
To put it simply, Americans have been eating oil and natural gas for the past century, at an ever-accelerating pace. Without the massive “inputs” of cheap gasoline and diesel fuel for machines, irrigation, and trucking, or petroleum-based herbicides and pesticides, or fertilizers made out of natural gas, Americans will be compelled to radically reorganize the way food is produced, or starve. (Kunstler 239)

Community Health

The current centralized food system has its greatest impact on community health, especially in urban environments. Community health is dependent upon many economic, social and environmental factors. For example, poorer neighborhoods tend to be less healthy because affordable, healthy foods are more difficult to access. Those neighborhoods with decreased access to nature and green spaces tend to exercise less and a neighborhood with high crime rates keeps people in their homes. One factor that needs more research is looking at ways in which the built environment affects health. Too many variables affect the health of a community that it is impossible to point to this one factor as a cause. However, enough research has been done to suggest a correlation between community health and food security. If access to safe, fresh foods is not available, a community will face health issues that directly impact the environmental and economic health of a community. Landscape architecture has the unique opportunity to contribute to safer access to nutritious foods through changes to the built environment.
Obesity and diabetes rates in the United States have been increasing steadily for at least the past 25 years, according to the Centers for Disease Control and Prevention (Prevention, U.S. Obesity Trends). In 2010, no state in the country had an obesity rate lower than 20% with Indiana coming in at 29.6% and Marion County at 29.8%. The rate was under 10% in 1985. Obesity rates in children have nearly tripled since 1980. Approximately 17% of children aged 2-19 are obese. This is about 12.5 million youths.

Diabetes rates are just as alarming. Diabetes rates in 2008 in Marion County were 9.8% of adults. That’s more than double the rate from 1994, when the rate was approximately 4.5%. These rates have a direct correlation to the data on physical activity. According to the CDC, 26.8% of adults in Marion County are physically inactive (Prevention, U.S. Obesity Trends) and are only reflective of those adults who report doing physical activity at work. One article states that a third of all youth are insufficiently active (Krizek 59). The lack of exercise and access to fresh, nutritious food makes it easier to understand such high rates of diabetes and obesity, but they are not the only health factors affected by food.

Hunger often goes unmentioned in the United States as a community health issue since it seems that there is always food nearby. Physical factors such as proximity to a grocery store and access to vehicles, public transportation and bicycling routes all affect how a community accesses food. According to the 2010 Hunger in America report by Feeding America, a nationwide network of food banks, 16.2% of Indiana’s population is food insecure (16.6% is the national average). Marion County is above both of these
rates with 17.4% of the county being food insecure and an average meal costing $2.23 (Feeding America: Hunger-Relief Charity). Gleaner’s Food bank reports that 8 of 10 Indianapolis public school students must receive free or reduced lunches (Gleaners Food Bank of Indiana). According to the census bureau, the poverty rate in Marion County in 2010 was 13.5% of families and 17.3% of all people (Bureau). That means that nearly 1 in 5 people in Marion County are unsure from where their next meal might come. These rates come at a time when the unemployment rate in Marion County is at 10% (Bureau). All of these statistics illustrate a lack of food security in Marion County and Indianapolis, and tell a story of a city in need of assistance. Fortunately, organizations such as Gleaner’s Food Bank in Indianapolis are helping in the fight against hunger in concert with such organizations as Indianapolis Parks Department, Indy Parks Foundation and Indiana University Health who are fighting obesity and diabetes through their own initiatives.

Gleaner’s Food Bank distributes food to residents of Marion County and 20 others that encircle the state capital. Currently, I.U. Health, Indianapolis Parks Department and Indianapolis Parks Foundation (IPF) have been working together to build an organic farm in Indianapolis (I.U. Health has provided a grant to IPF and Indy Parks to develop an 8 acre site for organic food production that benefits Gleaner’s Food Bank). Statistical data in Indiana and Indianapolis in particular, confirms that increasing healthier food choices in urban environments is a fundamental need. This initiative is being spearheaded by I.U. Health, illustrating the commitment of the Health Care
Industry in trying to move away from reactive treatment. Health care costs have become so high that many are moving towards a more preventative prescription of medicine that includes public projects that promote community health. Fortunately, IU Health and Indy Parks see urban agriculture as an opportunity to promote health through the built environment.

There is increasing evidence that suggests the built environment affects the health of a population. This is important to understand in a time when 80% of North Americans live in an urban setting and spend 90% of their time indoors. As defined in an article in the *American Journal of Public Health*, “The built environment includes our homes, schools, workplaces, parks/recreation areas, business areas and roads...The built environment encompasses all buildings, spaces and products that are created or modified by people.” (Srinivasan 1446). In the same article, the authors explain how evidence suggests that many physical and mental health problems are influenced by the built environment, “particularly to poor urban planning and inadequate housing” (Srinivasan 1447). The problems include attention deficit disorder, substance abuse, anxiety, depression, aggressive behavior, asthma, obesity and heart disease. Though it is unclear exactly what aspects of the built environment influence behaviors, it is clear that it has an effect upon health.

Many arguments are being made that this health epidemic is directly related to our sedentary lifestyle. The sedentary lifestyle is caused by designs in the built environment. Research has indicated that health burdens are more greatly experienced
by minority and low-income communities. This is due to limited access to good housing stock, communities that do not facilitate outdoor activity, and the lack of healthy food options (Srinivasan, 1447). According to an article in the American Journal of Public Health, land use and transportation patterns have serious health implications (Frumkin, 1454). These aspects of the built environment that discourage physical activity are primarily responsible for 200,000 deaths in the U.S. every year (Killingsworth, 169). This is equivalent to 10% of all deaths and 25% of chronic-disease deaths.

With this information, it is possible to develop a sustainable framework for increasing activity in low-income communities. Recent studies have shown that “sense of community” is stronger in a more walkable neighborhood that has well-maintained public spaces (Frumkin, 1454). Other studies suggest that crime is higher in neighborhoods with a “deteriorated physical environment” that includes unwalkable streets (Srinivasan, 1447). This is just one aspect of community design that will be touched on in the section about community design.

One must first understand how nutrition environments are part of the built environment in order to design for increased access to food. Karen Glanz and James Sallis are two of the leading researchers on the concept of nutrition environments, which they define loosely as “eating” (Glanz, 330). These researchers see the built environment as not only the neighborhoods, roads, buildings and recreational facilities, but also our food sources (Sallis, 90). Sallis also cites studies that support the idea that nutrition environments influence food choices and behaviors and can help explain
disparities in disease and behavior between different communities (Sallis, 96). It is important to note here that it is especially important during preadolescent and adolescent years to intervene to help create healthful lifelong behaviors (Krizek, 60). This is important in a neighborhood with over 600 youths under 18 years old and a plethora of fast-food choices nearby and not a grocery store in sight. Many sources have examined the relationship between the nutritional environment and racial and socioeconomic disparities in health. The evidence shows that fast-food restaurants are more prevalent in low-income, minority communities and that supermarkets are less common (Glanz, 330) (Booth 116).

The nutrition environment, or the American diet and healthy food choices, is stressed by the large, physical divide between consumers and places of food production (Litt 1466). Michael Pollan, noted food critic and author, often cites this as the biggest problem facing our country in terms of our food industry. Current research is looking into how visual and physical access to fresh, healthy foods influences behaviors related to consumption. Glanz and Sallis point to evidence in school lunches that shows a correlation between fruit and vegetable availability and their consumption among students. Jill Litt and her colleagues took their research into community gardens and found that community gardeners had a higher intake of fruit and vegetables than other home gardeners and non-gardeners. Accordingly, her research illustrates how social involvement helps to create better food behaviors among neighborhood residents (Litt 1469).
Nutrition Environments, as an aspect of the built environment, require more research. However, there is enough evidence to show that the qualities of a place are not just physical, but social as well, creating an even greater opportunity for health impacts (Frumkin, 1451). This project is proposing urban agriculture as a way to increase healthful food choices and greater social cohesion in the urban environment. The health benefits from this intervention go beyond healthy, nutritious food. Many studies have been completed that show that health benefits are found when people come into contact with nature (Srinivasan, 1447). Contact with nature has many health benefits including, but not limited to, fewer sick calls among prisoners, improvement in behaviors of ADD children, improved self-discipline, decreased mortality rates for seniors, lower blood pressure, less anxiety and better pain control (Frumkin, 1452-1453). At a time when children spend less and less time outdoors in nature, it is essential, especially in urban environments, to create a connection to nature (Louv).

The built environment in urban places has the potential to reconnect urbanites with nature and their food sources. A “sense of place” is essential to health and well-being, so the design of communities has public health value (Frumkin, 1452). This creative project attempts to redesign an impoverished community so that a “sense of place” is discovered and healthy living is greatly encouraged. Urban agriculture will next be examined to determine what aspects of the built environment can best be redesigned to include food as a way of creating healthier nutrition environments. Though there is limited research on the health benefits of land use policies supporting
sustainable and nonpolluting agricultural systems, the current practices of food production and distribution have a debilitating effect on community health (Srinivasan, 1448). Therefore, it is reasonable to explore urban agriculture as a sustainable, healthy way to promote active, healthy living.

**Urban Agriculture**

Urban agriculture is the use of land (public and private) in a city environment for the production of food. There has been a recent push for a local food movement in the United States. In 2011, it was reported that there are now over 6,000 farmers’ markets in the country, a 250% increase from 1994 (Bittman). “In 1943, 20 million households (three-fifths of the population at that point) grew more than 40 percent of all the vegetables we ate” (Bittman). This was a result of the Victory Gardens Program sponsored by the Defense Department as a war fighting effort.

Victory Gardens were an integral part of the war efforts during the early part of the 20th century. It is important to understand the origins of the movement in America, as well as abroad, so that current design for urban agriculture removes the risk of this movement just becoming a trend and then fizzling out. In Germany, Shraeber gardens were installed near factories as a way for workers and their families to produce safe, fresh food for little money. This sort of production was a precursor to the American victory gardens.
Urban agriculture has been an important resource during times of war or economic hardship but then seems to disappear when peace and prosperity return. The renewal of this movement provides us with an opportunity to help facilitate a decentralized food system that provides safer, healthier foods for urban communities for years to come. The Smithsonian Institute describes a victory garden as a vegetable garden used during war time to provide an adequate food supply for troops and civilians. Government agencies, private foundations, businesses, schools and seed companies all worked together to instruct and provide land and seeds for communities to grow food. The goal of these gardens was to provide enough food for entire families in the summer with enough surpluses to can and preserve some food for the winter. Colorful posters and magazine advertisements were used to spread the word about victory gardens (History). This is in stark contrast to current times when food advertisements dominate our media landscape with highly processed and sugary/fatty foods.

Victory Gardens were found all over the country. They were found in backyards, schoolyards, vacant lots, parks, and baseball fields. Children and adults alike planted and managed these spaces. Up to 41 percent of all vegetable produce consumed at the time was produced in these gardens. In 1943 alone, 20 million gardens produced 8 million tons of food. Though this program was initiated to help support the war effort by growing nutritious food, another positive byproduct was that it served as a “morale
booster” for the citizens at home. The gardeners were empowered by their contribution to the war effort (SF Victory Gardens History).

One of the first and most famous Victory Gardens were those in Fenway Park in Boston, Massachusetts (see Figure 2). A group, later known as the Fenway Garden Society, created victory gardens in response to a call by President Roosevelt to grow more vegetables to support the troops fighting in Europe and the Pacific in World War II. Boston established 49 areas to be used as victory gardens. The plots are approximately 15 x 25 feet, a standard size small, American allotment. Developed on 7 acres of Parks Department land, the Fenway victory gardens are one of the last remaining gardens from World War II. They reside in the Fens, one of six parklands designed as part of Frederick Law Olmstead’s “Emerald Necklace”. There are over 500 plots in the gardens and are still in use today. (Society)

The organization of the victory gardens has not changed much since its inception 70 years ago. An elected superintendent parceled out plots, managed the gardens and reported to the Parks and Recreation commissioner. Today, residents of the city can...
apply for a plot, and if granted access, pay a small annual fee that helps to maintain the gardens’ water resource. City government has continued to allow the Fenway Garden Society to use the parkland free of charge. Though under threat of development multiple times since its inception, the Massachusetts government has saved the gardens from destruction and has actually named them a Boston Historic Landmark. With over four hundred active gardeners, it continues to be a community resource in Boston (Kearney). Programming and events are planned that allow the wider community to participate in the stewardship of the victory gardens (Society). It is clear that these victory gardens will not vanish from Boston’s Fenway Park.

As stated previously, urban agriculture is not a new phenomenon. Shanghai and Beijing are just two examples of cities that are fully self-sufficient in fruit and vegetable production and consumption (Colasanti, 43). A 1996 United Nations report states that about 80% of families in some Asian cities are involved in agriculture. This is similar to reports on other cities in Africa and even Moscow (Brown, 20). The research seems to suggest that the United States is behind many countries in terms of integrating urban agriculture into the existing food system. However, one report suggests that 33% of the 2 million farms in America are found in an urban setting and produce 35% of all crops and livestock sold in the U.S. The value of these farms is estimated at $38 million per year (Brown 21). It is reported that 25% of urban households are involved in gardening and that the number of gardeners growing vegetables grew from 10 million to 50 million in a span of a few years from 1992 until 1995. This was before the recession of the early
21st century that has increased the need for urban agriculture as a response to economic hardship.

In no place is the need for fresh, local food in America more evident than in Detroit, Michigan. Still reeling from the downturn of the economy and the loss of jobs in the automobile production sector, Detroit has turned to urban agriculture as a way to provide jobs and food security (see Figure 3). Many researchers see Detroit as an incubating experiment that will determine the path of American cities in the foreseeable future. If Detroit succeeds with a sustainable, urban agriculture production model, then perhaps the future of America is safe from the hardships of economic recessions and food shortages that are sure to come. One of Detroit’s solutions to this problem has focused on the use of vacant land for food production (Hodgson 72). Though many of these sites that were previously industrial or commercial in their use are brownfields, new forms of remediation are available to make these healthy, productive landscapes. Another issue being faced in Detroit is that of neighborhoods of abandoned homes. Agricultural reuse of vacant land can provide solutions to empty lots, and the surrounding abandoned

Figure 3 - Harvest at Earthworks Community Garden in Detroit, Michigan (Kitchen)
buildings can also provide space for food production and sale (Hodgson 7). Community gardens in deindustrialized areas are a good land use not only due to its ecological and social benefits, but also the minimal investment and the ability to develop the site further in the future (Colasanti 41). Detroit’s population of 971,121 lives in an area approximately 138 square miles. Approximately 50 of those square miles are vacant (Hodgson72).

Its international reputation for urban agriculture is well-deserved; Detroit has over 600 community, school and institutional gardens. This number does not include the guerilla gardens and small farms where land is used without permission. Many non-profits and educational institutions provide support for urban agriculture by providing supplies and technical assistance. Four of them reported having given support to over 875 gardens in 2004 (Hodgson 73). It is clear that community gardens have become an essential part of the urban fabric. Many see the next step as creating larger, urban farms.

Kathryn Colasanti, argues that Detroit is possibly the best place to test urban agriculture on a larger scale. She argues that it is essential to sustainable urbanization because it generates social and environmental benefits (Colasanti, 42). It is no surprise then that John Hantz, a multi-millionaire, decided in 2009 to build the world’s largest urban farm on hundreds of acres of vacant, abandoned land in Detroit. Proponents of such a large farm believe that it is the only way to make urban agriculture viable economically, while detractors believe that this project will result in industrial farming
practices that degrade the land. This is all happening at a time when there are still very few zoning regulations on urban agriculture but the city government is working hard to address these issues. Many in Detroit would like to see commercial agriculture banned through zoning laws to avoid industrial farming from taking over from the grassroots movement on which urban agriculture in Detroit is based. It is interesting to note that on less than 300 acres of vacant parcels in Detroit, the city could produce 31% of seasonally available vegetables and 17% of seasonally available fruits could be produced without storage or season extension (Colasanti 50). Detroit is heading in an important direction in the 21st century and it could be a shining example for post-industrial cities all over the Midwest and as a road map for moving forward in economically uncertain times.

Community gardens are just one part of a vast network of productive landscaping in urban environments. Urban agriculture has many typologies beginning with economic production - whether to be an entrepreneurial farm or nonprofit. Other farming decisions are related to growing techniques such as whether to use intensive methods or traditional methods. Additional typologies include employee based or entirely volunteer based farms. There is also a distinction to be made between urban and peri-urban farms (those on the perimeter of the urban core). The final typology is whether to create a share or a community system. Garden sharing is a system in which one person provides the land so that another can work on it without owning it. The other is community owned so that the site is owned by those growing produce on it.
These many typologies will help to define the type of farm that best suits Windsor Village in Indianapolis (Philips). Hodgson puts urban agriculture into three main categories: Non-commercial, commercial and a hybrid. Non-Commercial ventures include private, community, institutional, demonstration and guerilla gardens, as well as edible landscapes and hobby chicken and bee keeping. Commercial ventures include market farms, urban farms, periurban farms and beekeeping. Hybrid urban agriculture is any combination of farms that produce edible plants, bees, fish, or other animals for “personal consumption, education, donation, and sale” (Hodgson, 17-18).

It is also important to examine the type of landscapes that are being used for urban agriculture. This includes schools, restaurants, hotels, community gardens, rooftops, yards, vacant lots, farms, streets, community centers and churches (Philips). Though this is quite a list, many more urban landscape typologies are ready to be explored as incubators for urban agriculture (Nordahl 52). Darrin Nordahl argues that public spaces are in important part of urban agriculture and that streets, sidewalks, parks, squares, plazas, parking lots and municipal buildings are all worthy of exploration (Nordahl 52). It is important to note that William H. Whyte wrote in his seminal work, *The Social Life of Small Urban Spaces*, that “If you want to seed a place with activity, put out food...Food attracts people who attract more people.” (Nordahl 52). Written almost thirty years ago, it is clear that food will always be a social conduit. Therefore, it is imperative to give urban agriculture an honest look as a way towards sustainable urban development.
Urban agriculture has many benefits and very few negative consequences for any urban community. In the next few paragraphs, the benefits and negative consequences will be examined to help determine the impact that community ("civic") agriculture could have on an impoverished, urban community. Community gardens have the physical and social health influence that deserve examination and are a central focus of the design for Windsor Village. The government of Australia’s Standing Committee on Health and Aging created a report that lists a wide range of potential benefits from community gardening, including community building, environmental sustainability, access and inclusion, education and job training, economic development, arts and culture, and most importantly in this report, health and wellbeing (Ageing). The gardens provide a hub for locals to gather and build friendships. They help to build community by increasing intergenerational interaction and the links between groups and individuals; and, most importantly perhaps, community gardens provide opportunity for actions that promote self-help.

Community gardens can encourage environmental sustainability by becoming a demonstration site, where one can learn to live and eat sustainably. It also reduces a consumers’ ecological footprint that is increasingly contributing to climate change. Waste management allows for the transformation of much waste back into food through activities such as composting and aquaponics. The integration of green technologies, such as photovoltaic panels and wind turbines, can help to make the site more sustainable by helping to create energy on site. The gardens can contribute to
food security by providing a local outlet through which to consume fresh fruits and vegetables. And finally, community gardens help to green the urban environment and create an advertisement for a more sustainable lifestyle (Ageing).

The sustainable lifestyle is important because not many citizens in an urban setting have access or feel inclusion in sustainable movements. Community gardening affords the opportunity for intergenerational interactions that promote social inclusion. It also allows for inclusion of linguistically and culturally unique populations, as well as those with disabilities and senior status. In addition to social inclusion, education and job training are an important benefit of community gardening (Ageing). One problem currently plaguing our agricultural system is the average age of the farmer. Fortunately urban agriculture programs allow young adults and youths to become educated about farming operations and management. These youths are empowered with potential for jobs in the urban core related to farming. Colasanti argues that “urban agriculture can support local economies by providing vocational training, producing goods and services, and bridging market gaps in the mainstream food system” (Colasanti 42-43). This, in addition to outdoor classroom opportunities, creates an urban agricultural experience that allows for the education of future leaders in this field, while at the same time providing opportunities for economic development. Nurseries, markets, cafés, and training programs all stimulate local economic growth (Ageing). These economic drivers are all a byproduct of urban agriculture.
The growth of community gardening has also provided space and an outlet for local artists to create artworks with the community and help to preserve cultural traditions (Ageing). This is important to the communities’ health, as it can promote social cohesion, thereby decreasing violence. One source from the Journal of Public Health Policy argues that two reports from Philadelphia and San Francisco show a large reduction in thefts, drug dealing and burglaries in communities that have community garden projects (Brown 28-29). It is clear that urban agriculture has a positive effect on the health and well-being of a neighborhood and its citizens.

The practice of gardening provides physical activity and recreational opportunities. It is also used as horticultural therapy for older generations. Community gardens promote health by creating greater access to nutritional foods and even bring psychosocial benefits to communities. Community kitchens promote community health and individual health by providing a space for people to cook, learn and eat together (Ageing). Brown and Jameton state that, “the mere presence of vegetable gardens featured significantly in this research as a positive community influence” (Brown 28). They go on to state that recreational gardening has stress reducing capabilities and studies support evidence that coming into contact with a plant lowers blood pressure and reduces stress, anger, fear and muscle tension. For this reason, gardens are grown for their productive qualities in prison and patient care environments (Brown 28).

Urban agriculture, especially community gardening has been shown to increase fruit and vegetable consumption (Colasanti 46). Glanz also finds a correlation between
the availability of fruits and vegetables at school and how much students consume. This has become an accepted notion and the nation has been developing school gardens again. Research done in a 2008 survey of 776 adults in one US city found that homes with a community garden participant consumed fruits and vegetables 1.4 more times per day than those households that did not have a participant and were 3.5 times more likely to consume the recommended portion of 5 servings daily (Alaimo). The authors of the study suggest that gardens increase fruit and vegetable consumption, by providing low-cost, high-quality produce, which will increase preference for fresh foods (Alaimo).

It is clear that urban agriculture can increase individual and community health, but empirical studies have also documented environmental benefits of improved air quality, cooler buildings, improved biodiversity, preservation of cultivatable land, waste and nutrient recycling and stormwater management (Colasanti 42).

Not only does access to food production create healthier communities and people, but it also allows for greater contact with nature in the urban landscape. Urban agriculture creates more habitats in the urban setting and therefore increases the amount of wildlife in an area. It is integral to the education of youths in an urban area with little access to a natural environment (that land which has never been developed). Krizek notes that children are critically in need of an “intervention to promote healthful lifelong behaviors” (Krizek 60). It is clear that urban agriculture has a role to play in the 21st century as a way to reconnect citizens to their supporting environment, create healthy nutrition environments, and provide economic stimulus. There is any number
of reasons to support urban agriculture as a sustainable community development tool, but one must be wary of inherent risks in its application.

One of the most prominent risks associated with urban agriculture is the use of bad urban soils as the growing medium. Oftentimes, gardeners will use raised beds and bring in their own soil to grow. Industrial and agricultural sites often leach chemicals into their surroundings. Lead is not as big a problem as it used to be since unleaded gasoline is available everywhere (Rosen). Other important risks to consider include secured land tenure, sustained interest, community development and appropriate design (aesthetics and maintenance) (Milburn 71).

Secured land tenure has always been a difficulty for urban agriculture as gardens have most frequently existed as interim land use (Milburn, 75). The most common arrangements are leases, land trusts and partnerships, though some cities in the U.S. are beginning to use urban planning and policy to create zoning laws that support urban agriculture (Milburn 75). Darrin Nordahl also paints a bleak picture for community gardens without the help of local government, “Only when the municipality relinquishes control of the land, or a long-term lease is agreed upon, will longevity be guaranteed to the community garden” (Nordahl 63). This problem is becoming easier to solve in the United States as governments are beginning to incorporate agriculture into public lands, protecting land tenure for community gardeners and providing greater accessibility for the surrounding community. As churches, healthcare facilities, schools, nonprofits and
housing developments become involved with urban agriculture, land tenure will become less of an issue.

Lack of interest is the most common reason for the failure of community gardens, according to a 1996 American Community Gardeners Association. This makes it imperative to sustain strong initial interest with a good location for the garden, leadership opportunities, community outreach and funding sources (Milburn 76-77). Research has found that communities with a high percentage of renters will desire a community garden more, but one should be wary since low income and rental communities are much more transient (Milburn 77). Research has also shown that urban agriculture can raise property value and lead to gentrification of the neighborhood, which often displaces original inhabitants and shifts land use towards redevelopment and backfires on those that wish to cultivate farms in the city (Metcalf 8).

Often, community development hinges not on the availability of a community garden, but how the garden develops (Milburn 79). It is important to involve the community and help them understand the importance of community food security and eating locally. If the community garden is not maintained and organized by community members, then the site will often be abandoned and vandalized because the locals will not have a sense of ownership (Milburn 79). However, when the community is involved, gardens have the potential to build relationships through “parties, garden potlucks, educational workshops, pairing experienced and inexperienced gardeners, craft days,
cooking and preserving classes, organic gardening classes, classes to share general gardening tips, and activities for children and families” (Milburn 79). It is important that these classes be integrated into a larger network of similar community activities in any urban area to help strengthen community gardens.

Organization of the garden is also important in community development. The organization must be guided by the needs and goals of the neighborhood. The internal organization includes defining garden rules, member rights, resource use and event planning. The inclusion of community members in the internal organization process can “promote stability, trust and a foundation for growth” (Milburn 80). Therefore, it is also important to involve community members in the design development. Though the design of urban agriculture will be discussed in more detail later on in the background, it is important to note that collaborative efforts are most successful and that larger design visions are helpful (Milburn 80). While good design is essential to a successful urban agriculture venture, it is equally important to design for good maintenance.

The maintenance of a site clearly is a representation of its aesthetics and is therefore essential to protect the communal good favor most urban agriculture sites enjoy. A common complaint from communities is that “vegetable and fruit gardens are a bit unkempt, or even downright ugly, and thus inappropriate in public settings” (Nordahl 91). Nordahl cites public officials who argue that food-bearing plants are messy and difficult to maintain and should be left out of urban environments. However, with proper education and awareness of foods available for gleaning in the urban
setting, food bearing plants can provide a community with many nutritious fruits and nuts. To combat this, one must utilize a diverse plant pallet of edibles and ornamentals (Nordahl 91). The irony is that many of the street trees chosen by city officials often bear inedible fruits that can also be a safety hazard and even a liability (\textit{Prunus cerasifera, Prunus serrulata, Pittosporum undulatum, Cotoneaster, Liquidambar styraciflua, and Aesculus x Carnea are a few examples}) (Nordahl 92-93). Though the aesthetic value of these plants is high, Nordahl asks the question if it is worth the mess they make. He argues that plants such as fig, persimmon, Asian pear, lemon, banana, orange, pomegranate, almond and others can be equally pleasing in its aesthetics, while at the same time providing nutrition for the community.

Richard Register, an environmental planner and urban theorist argues that fruit and nut trees do not need to be illegal along streets in cities. He writes that to offset the aesthetic offenses and safety hazards associated with fruit and nut trees, one must first develop legal procedures that ensure responsibility for the trees, either by a city-hired orchard farmer or by making the landowner responsible for upkeep of the tree and sidewalk. Secondly, Register argues that people should become more responsible for themselves since a legal settlement would not yield much profit in any case (Register). Education must happen in this case so that waste is minimized and people maximize their nutrition environment by gleaning food from street trees and edible gardens. Maintenance and aesthetics play a clear role in developing community by helping neighbors to take pride in their neighborhood. In order to maintain proper
maintenance and aesthetics, it is of great importance to examine traditional park and community design methods and how they may be integrated with urban agriculture.

**Park Design**

Park design in the United States dates back to the early 19th century. Many typologies exist including landscape parks, recreational parks, historical parks and pocket parks to name a few. The first urban parks were usually referred to as commons, sites which were used for cattle grazing and militia training. Boston Common, 44 acres set aside 6 years after the initial settlement is an excellent example of how parks in the United States developed. From 1820-1840, a movement started that called for tree-line paths upon which to stroll for nearby citizens. It was at this time that cattle’s grazing was ended. This improvement was mimicked in cities all over New England, and Mid-Atlantic States. This is when urban parks became more similar to what we see today. The Common in Boston now features many recreational facilities that increase the usability of the site (Low).

The evolution of Boston Commons is in contrast to the landscape park that is such an important part of many urban environments. Designed as refuges from the city, landscape parks utilized English pastoral landscape design that included pastures, woods, gathering places and water elements that seemed to transport citizens out of the city and into nature. Romanticism rose as a movement during the industrial 19th
century in response to the increased pollution and crowded living situations. Landscape parks were an escape from the oppressive conditions of the city. Cemeteries were a precursor to the urban landscape park and were often used as picnic sites for middle-class urbanites (Low 21).

Vernacular landscapes that contrasted with formal park design were sites that were common open space, un-designed and unplanned. These “common open spaces” were drawing more people to recreate and picnic than the urban parks were. Thus, urban farms began to imitate these places and add recreational facilities to existing parks, along with large, open spaces for people to gather. There was also the vernacular tradition of “pleasure grounds”, which mixed arts and decorations and featured fountains, grottos, statues, arbors, art displays and vendor stands for food or performances (Low 22). These were integrated less as many park proponents found them vulgar. Frederick Law Olmstead, one of the first landscape architects and the designer of Central Park in New York City, always tried to keep balance in favor of natural materials over recreational facilities, museums, zoos and memorials (Low 23). Olmsted, therefore, created lakes, streams, waterfalls and pastures often in his park designs. Olmsted was clearly ahead of his time in understanding nature’s effect on the urban population and was trying to create a habitat refuge for animals, humans included.

Near the end of the 19th century, many cities, including Boston, developed a metropolitan woodland reservation. This was begun by Charles Eliot, a partner in
Olmsted’s firm. In the 1890’s, Eliot and others built upon Olmsted’s vision for a park system of many parks to bring access to all Boston citizens. This led to land acquisitions by many metropolitan governments which instead of “creating idealized scenery”, preserved existing landscapes that needed only slight modification to expose views and maintain clearings. This idea, pioneered by Eliot and Olmsted, that scenic land should be reserved from development, led to the creation of county and state parks across the United States (Low 24). The state park movement reserved magnificent scenery and has preserved natural resources for communities to enjoy still today. This led to the development of the national park system, as well. (Low)

The period of the 1920s to the 1930s brought about changes in urban park design that is more consistent with what we so often see today. The progressive movement at the turn of the 20th century tipped the balance of parks in favor of active recreation over contact with nature (Low 26). It was believed that recreation would bring more benefits, especially to children. The playground was born out of this movement, and while most people attribute its development to design done in Chicago, Olmsted had built an “outdoor gymnasium” in Boston in 1892. As the federal government began to fund local parks, recreational facilities greatly increased in the 1930s. It was also at this time that the proliferation of the automobile necessitated the inclusion of large parking lots. (Low)

This next section will look at how parks are traditionally designed by a landscape architect. Things to consider in the planning and design process of an urban park
includes the size, shape and number of them, their connections and edges, appearance and sensory issues, naturalness, the integration and sustainable use of water and plants, respect for wildlife, climate and air, the site users, safety management and public involvement (Forsyth). These aspects of any site must be taken into consideration before any park design can be effective.

John Simonds, a former president and fellow of the ASLA (American Society of Landscape Architects), wrote many books on the process of site planning and practiced extensively in the 1950s up until his death in 2005. The information gleaned from his text, *Landscape Architecture: A Manual of Environmental Planning and Design*, helped guide the design portion of this project. Simonds begins with programming guidelines for what one desires to achieve. These guidelines influence the site selection which should be chosen on its ability to adapt to the programming guidelines (Simonds 102). Simonds then recommends the designer conduct a site inventory and analysis to determine the physical, social and cultural features of a site and how they offer opportunities and threats to the objectives set for in the program. One analysis is complete, conceptual development can begin which includes much iteration to help find the best conceptual layout for the site. A well-designed plan is one that “gives evidence of response to all site factors, a clear perception of needs and relationships, and a sensitive expression of all components working well together” (Simonds 113). Once a conceptual design is chosen by clients, a final documentation of the site design and supporting construction documents is provided to the client and contractor to begin
development. This type of design process has guided landscape architects for a long time, and while it is a linear process, it has many intricate cyclical processes that include research feeding design and design feeding research.

This creative project uses a cyclical method of design based on John Simonds methods. It includes much research in the inventory section to be able to create evidence based design. The economic, environmental and social conditions of Windsor village make their park an excellent place to enhance the usage through urban agriculture. Urban agriculture can provide jobs, increase wildlife habitat, educate citizenry, provide horticultural therapy, and most importantly perhaps, provide nutritious, healthy foods to community members. This project integrates urban agriculture in a way that provides opportunity for expanded programming. The parks system currently is struggling to maintain its large tracts of land, but the appropriate integration of agriculture can help them in providing more community members that take on a stewardship role in their community. Typologies of urban agriculture were examined to determine how best to manage and produce crops with community and organizational support in an urban park. From this research, it is clear that urban agriculture can play a great role in expanding the uses of our natural spaces so that our parks have greater value to the community, the country and the world.

Urban agriculture is not new to parks. From early park commons to victory gardens and now community gardens, parks departments across the country understand the need for continuity of land tenure. Since so much land associated with
community gardening and urban agriculture has unsecured land tenure, it is essential to look at parks, which have a stable land tenancy, as a catalyst for organizing and promoting health through urban agriculture. This project examines how a small, urban park can provide the necessary programming while at the same time integrating intensive, organic farming techniques that will educate the citizens about the environment and food production, provide an economic boon, and increase community health.

Victory Seed Company wrote, “A form of insurance is the ability to provide for yourself and your family – having the knowledge to produce and preserve your own food is an investment vehicle in its purest form” (Nordahl 115). Nordahl contends that before one can integrate better food into a community, better food choices must be taught. Public space: streets, parks, plazas, squares and campus grounds can all provide an educational experience in this regard (Nordahl 117). This is better known as food literacy education and it is essential for public officials to lead in this matter. Indianapolis parks department has begun a program doing just that and has plans to continue it into the future. Thus, this project provides a framework for a small neighborhood park to become an urban agriculture education center. Food courses and curricula could be developed and offered through the public parks as well. Access to parks and recreation facilities and programs with youth activities is strongly linked to adolescent physical activity (Sallis 94-95). Parks departments will continue to become strong leaders in community health through their park systems.
There is much support for the integration of agriculture into urban parks. Brown writes that “Future public health advantages from urban gardens could be further enhanced if gardens were incorporated along with parks and wildlife corridors in a city’s overall plan for “green space”” (Brown 29). Nordahl explains that planners, environmentalists, policy makers and educators are also promoting smaller farms closer to the city and even new farms “interwoven into the urban fabric”” (Nordahl 10). Frumkin noted that Jane Jacobs and William Whyte, both famous urban planners, designers, and historians, found that mixed land use around parks was a good way of designing an urban environment (Frumkin 1452). Frumkin’s research states that urban citizens are partial to a “balance of trees and pasture, clear borders, and alluring paths that curve out of sight.” His research also found characteristics of preferred places in many studies included “spatial definition, coherence, legibility, and mystery (the promise of learning more through exploration)” (Frumkin 1452). In the same article, he contends that amount and type of vegetation, curving pathways, quiet areas, recreational amenities, attractive scenery, good lighting and signage, and safety all influence the health benefits of a public park by encouraging greater physical activity. It is clear then that urban agriculture can play a role in city parks by providing opportunities for designs that enhance physical activity, and at the same time produce fresh foods.

While it is important to look at historical case studies of urban agriculture within parks, it is equally valuable to understand what contemporary designers are doing with
edible landscape designs. Walter Hood, a famed landscape architect, designed the 50 Cent Community Garden in Jamaica, Queens, New York City (see the Site Plan in Figure 4).

The site had been a community garden when it was up for auction in 1999. The New York Restoration Project (NYRP), an organization that cleans and restores park spaces and gardens in the city, purchased the site and asked the gardeners what they wanted from the site. In these meetings, the NYRP discovered that none of the gardeners liked the aesthetic appearance of the site and made simple recommendations to improve it. Most of all, the community wanted a design that was more open and welcoming (see Figure 5).

Walter Hood created an urban...
agricultural park unlike any that had been built before. Linden trees mark the entrance with a groundcover of carpet roses. An arbor covered in trumpet vines runs the length of the site. Inside the garden, vegetable beds are laid out in a parallel manner to reflect the rail line that runs on the north east side of the site. Hood utilizes French parterres to create formal spaces in which heirloom vegetables can be grown. The edge is defined using boxwoods and creates a very formal aesthetic. A more interesting part of the design is the giant rainwater collectors which resemble “giant blue martini glasses” (see Figure 6). They funnel 3000 gallons of rainwater to underground cisterns and provide a sustainable water source. These massive collectors tend to draw people into the site and Hood hopes it is “something that might capture the imagination” (Nordahl 112). This modern design will be helpful in determining how to aesthetically create a community park and garden that reflects the needs of the community.

The research in this park design and precedent study section clearly illustrates how urban agriculture can be integrated into the design of city parks so that community health is increased. The current condition of our domestic and globalized food systems require new considerations of public open space as productive land. If implemented
successfully, urban agriculture within public parks can help to revitalize a community by providing greater ecological, economical, and social health, as well as lasting behavioral changes that create a more nourished community. If public space is considered for urban agriculture interventions in neighborhoods, then so must vacant lots and buildings within the community. Therefore, it is essential to examine how a community can be designed with urban agriculture so that the park can continue to function with its current programming, while providing the enhanced opportunities offered by urban agriculture.

**Community Design**

The design of Windsor Village Park and community requires an understanding of community design history and current trends in a health based approach. The integration of urban agriculture into community design examines an American case study as a way of determining what works and what does not in the application of urban agriculture in neighborhoods. Though much has already been said about the health advantages urban agriculture landscapes can provide a community, it is important to understand its application in community design.

This project does not provide plans for a completely new neighborhood. Instead, interventions in the design will be made based on principles gleaned from community planning and design techniques currently used by landscape architects. This
research will illustrate why certain choices for the design of Windsor Village were made in the first place.

Simonds states that current problems within community design are monotony, inefficiency, unhealthful conditions and danger (Simonds). The monotony of the design risks the destruction of habitat and the covering of streams and water features. Inefficiency is caused by lack of access to services such as schools, shopping and recreation. In a new planned community, houses are clustered around activity centers and accessible by foot or bicycle. Inefficiency in the design of the infrastructure systems in the right of way leads often to the topping of trees to save power lines. Simonds suggests placing utilities along rear property lines. Simonds argues that our urban neighborhoods create unhealthy people by not providing opportunities for healthy exercise, recreation and group activities. Finally, danger is a problem with 20th century community design because of ill designed street crossings and intersections, mixing of people and vehicles, overhead power lines, toxic water and soil contamination and polluted air. Crime is also a threat in places with lots of vacancies, and lack of better places to be and things to do (Simonds 277-282).

The problems with community design as pointed out by Simonds can be mitigated through interventions to improve the site. Building arrangements, access and circulation, activity centers and open space all provide opportunities for design interventions to improve community health. Building arrangements, though unchangeable for an already built community, play an interesting part in community
design since arrangements have historically been made to accommodate the vehicle first. Simonds argues for circulation routes based on the pedestrian and not the automobile and the streets fit to the topography. He encourages parking courts and keeping housing arranged towards pedestrian zones. Activity centers must also be arranged in close proximity to clusters of homes. Many activity centers have been sited near mixed use housing clusters (Simonds). Compatible uses are often combined in these activity centers such as a school and park. Schools, shopping and recreation should all play a part in the community center (Simonds).

Finally, open space is essential to appropriate community development. Simonds states that outdoor spaces are where communal living happens. He argues that lineal spaces should be woven into the community fabric. Jogging paths, health trails, greenways can all help in this way. Communities require active recreational spaces that require more construction and passive spaces that are often times no more than an open field. These open spaces can also serve an ecological function by preserving natural green spaces that provide habitat and nature contact in the urban environment. Available spaces for intervention include street right of ways, parks and recreation spaces, and any land bought or donated by an outside or inside the community source, such as government agencies with landholdings, non-profit foundations or private citizens (Simonds 285).

Simonds claims a new approach to community planning has been used that centers around preservation, conservation and development (P-C-D). Preservation is
required of spaces in a community with scenic, historic or ecological value. Conservation is reserved for those open spaces where recreational uses will not harm local ecologies. And finally development is the construction of spaces that are on higher grounds and spaces that will not impact the local environment much so that people can live within natural surroundings (Simonds 286). Though these principles are most important when designing a new, planned community, they must be considered in a community design intervention in Windsor Village.

Windsor Village was once a planned community but one must examine how communities evolve and can redevelop. John Kromer, once the director of housing in the city of Philadelphia, wrote a book about his experiences reinvesting in the city and its’ neighborhoods. He writes of three overarching principles that have guided his reinvestment work. The first being in a time of recession, resources are often limited, but there are excellent opportunities to invest in neighborhoods. Communities and cities must make use of non-governmental funding sources to speed up neighborhood reinvestment. The second principle is that the process of reinvestment must be done as collaboration between community members and local government. This ensures that his third principle is adhered to: that no one be excluded from the process of reinvestment. Kromer argues that many tools must be used in the revitalization of urban neighborhoods that includes strategic planning, housing finance, community organizations, job training, public housing, services for those with special needs, and perhaps most importantly, advocacy (Kromer). These aspects of community are
considered in the revitalizing design put forth in the planning and design of Windsor Village.

As mentioned in the community health section in this chapter, there are many new directions in community design that are increasingly concerned with education and health. Killingsworth and Frumkin both argue that the built environment affects our “sense of community” and health behaviors. Both argue that physical activity and sense of community increase in walkable and well-maintained neighborhoods (Frumkin). Killingsworth supports planning and transportation systems that integrates walking and bicycling as a way to increase health through physical activity (Killingsworth 170). Dannenberg et al., state that “Data suggest that such community characteristics as proximity of recreation facilities; street design; housing density; and accommodation for safe pedestrian, bicycle, and wheelchair use play a significant role in promoting or discouraging physical activity” (Dannenberg 1502). This project imagines a neighborhood that creates a healthy nutrition environment and provides community health, physically, socially and economically. Glanz states that changes to the built environment and public policies are the “most promising strategies for creating population-wide improvements in eating, physical activity and weight status” (Glanz 330).

The idea of a healthy, sustainable community is not new. The President’s Council provided a definition in 1993, “healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are
secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives” (Srinivasan 1447). Luc Mougeot, an important urban agriculture researcher also views it as a way forward towards sustainable urbanization that links cities with their environments (Mougeot 11). The benefits of urban agriculture make it a valid approach to community design and its role in an impoverished neighborhood in Indianapolis.

In the course of research for this creative project, the name Thomas Lyson, a former professor of sociology at Cornell, came up repeatedly. He coined the term, “civic agriculture”, and defines it as “a commitment to developing and strengthening an economically, environmentally, and socially sustainable system of agriculture and food production that relies on local resources and serves local markets and consumers” (Nordahl 9). He believes that civic agriculture filters the drive to earn profits through social relations that are mutually beneficial. Lyson argues that community problem solving lays the foundation for “civic agriculture” (Nordahl). This idea drives the formation of an urban agricultural design that will revitalize Windsor Village. It is prudent to examine how agriculture has been integrated into planned communities and so Village Homes, in Davis, California, is examined as a case study.
Village Homes (see Figure 7 for Site Plan) is a community that started construction in 1975 in response to the mid-1970s energy crisis. Built on 70 acres of land, the development includes 225 homes and 20 apartments. The design is developed around the idea of 18 pocket neighborhoods. It was designed by Michael and Judy Corbett, a husband and wife team of developer and designer, who drew inspiration from Ebenezer Howard’s garden city vision, as well as the 1929 garden city plan for Radburn, New Jersey (Chapin 125).

The streets are oriented east-west so that lots are north-south oriented, allowing for passive solar designs to utilize the sun’s energy. The narrow street width of no more than 23 feet decreases the urban heat island effect by minimizing pavement. There are no sidewalks which forces the cars to move more slowly (Association). Along the streets, fruit and nut trees were planted to provide sustenance to the community from over 30 varieties of fruit trees. At the end of each street is a cul-de-sac that provides

Figure 7 - Site Plan for Village Homes (Chapin, 125)
connections to the village commons. In addition to these pathways, midblock passageways provide even greater access to the commons. The commons are surrounded by houses that form a pocket neighborhood connected by small walkways (Chapin 129). Clustered mailboxes also provide opportunities for neighborhood interactions and the many gathering spots on site provide ample opportunity for leisure time with friends and neighbors (Chapin 129).

Forty percent of the total acreage on the site is dedicated to open space (25% greenbelts and 15% common areas). It features two large parks, greenbelts, several orchards, community garden spaces and two vineyards. Only 13% of the community is devoted to streets and parking and the rest (47%) is dedicated to private lots (Association). This open system allows for children to grow up in a community where they are free and empowered and safe from busy streets and crime. The neighborhood is surrounded by “ribbon walkways” that connect Village Homes to the surrounding communities (Chapin 129).
Bike and pedestrian paths lead through most of the common areas that include landscaping, gardens and play structures. Houses are oriented to face the common area so that the focus is on the pedestrian rather than the automobile. The design was ahead of its time in the usage of a natural drainage system that included creeks, swales and ponds that decreased stormwater runoff in the neighborhood and provided a pleasing landscape aesthetic (Association). Long considered one of the first “green” neighborhoods in the United States, it is essential to draw lessons from the Village Homes neighborhood and apply the successes of the design elsewhere (Chapin 124).

As food issues becoming increasingly important in the 21st century, landscape architects must find a greater role to play. Andres Viljoen, a Dutch Landscape architect, has done research into what he calls “Continuous Productive Urban Landscapes” or CPUL’s. He touts this approach as a strategy for integration of urban agriculture into urban planning and sustainable infrastructure. Viljoen defines it as “a coherently planned combination of connected open urban spaces which include space for urban agriculture and ecologically productive landscapes.” (A. B. Viljoen 35). He examines Havana as a case study because there are so many connections between productive
landscapes, parks and open spaces. He provides visual characteristics that define productive landscapes as enclosure, multiple uses, shared visual facility, linking devices, sculptural qualities and incremental occupations (A. B. Viljoen). This systematic approach to design of urban agriculture provides an example of how to proceed with community designs that will activate nutrition environments and create healthier landscapes in Windsor Village.

Healthy exercise, recreation and group activities can be created through the integration of urban agriculture into a community. John Simonds argued that these opportunities are essential for the health of a community. Cities have the opportunity to expand productive landscapes into the neighborhood environment. Streetscapes, vacant spaces, organizations and businesses all offer potential landscapes for integration. Safer connections can be created between these spaces through the use of greenways and bike paths that connect urban agriculture to community members, public transit stops and commercial centers. Windsor Village has much vacant and open space that could be utilized in this fashion.
CHAPTER 3

SITE INVENTORY & ANALYSIS

The site is located in Indianapolis, Indiana as part of the Marion County community of Windsor Village in Indianapolis, approximately 5 ½ miles east-northeast of downtown’s monument circle. The western edge contains dense, residential neighborhoods, a hospital and many larger parks such as Ellenberger and Forest Manor Parks (see Figure 11). Commercial and industrial land uses adjacent to the Windsor Village community, are cutoff by physical features in the landscape. To the north and east of the site is Interstate 70 East, while an active rail line runs along the northern edge of the site. North Arlington Ave to the west and East 21st street to the south are both busy, 4-lane roads that offer very few safe crossings. The lack of access and connections help to make this a perfect site for a community revitalizing design.
It is located (see Figure 10) approximately 1 mile west of Indy Urban Acres, the 8 acre organic farm initiated by Indy Parks, Indy Parks Foundation and IU Health. This could create a great connection between the two sites and a greenway could be created that becomes an educational, agricultural trail. In discussions with Indy Parks and the community center director, it became clear that an urban agricultural intervention was thought appropriate for the community and the park. Though it has many opportunities and constraints, the site is ideal for an urban agriculture intervention in community and park design.

SITE HISTORY

Originally developed to supply workers for the industrial site directly south of the neighborhood, Windsor Village began development between 1941 and 1956 (based on aerial site photography found using Geographic Information Systems-GIS). As Indianapolis continued to grow, much commercial and industrial development took place to the
south, east and north. When Raytheon purchased the industrial site to the south, many residents lost their jobs and were forced to move, leaving many homes vacant. As mentioned previously, mortgage frauds were especially rampant in this neighborhood leading up to the 2008 recession (see Appendix A for more detail). This led to even higher vacancy rates. Currently, the landscape of this community is not well maintained. Overgrown lawns, shrubs and trees litter the neighborhood and abandoned houses stick out. Infrastructure poles line the street and seem to dominate the visual field. The amount of crime in the neighborhood is high and could be decreased with design interventions.

The park at the northeastern edge of the neighborhood was redesigned in 2009 by Synthesis Architects, based in Indianapolis. Meant to provide a safe place to play for the neighborhood, this design has worked reasonably well. The new community center building has been greatly successful with Ping-Pong and pool tables, an indoor basketball court, an education center, fitness room, career and training room, kitchen and gathering space. The landscape leaves one wanting more, however. Rarely used except for the shelter and the basketball court in good weather, this public space has the potential to provide greater recreational opportunities that enhance health and nutrition (see figures 12 and 13).

Southwest of the site there is a commercial area surrounded by high density residential apartments. This commercial area contains a health clinic and a few stores and restaurants, but fails to provide a safe place to access fresh food. The site is also
located in a food desert (see figure). The lack of access to fresh, healthy foods and even a local supermarket, make it imperative to reconnect Windsor Village to food sources.

Windsor Village Park, the community park in the northeastern corner of the site, provides an excellent opportunity for redevelopment with urban agriculture (see parks plan of site). The large right of way along the streetscapes, community churches, and the immense amount of vacant parcels around the neighborhood provide numerous opportunities for creative integration of a plethora of urban agriculture typologies.

AREA HISTORY

In 1864, Governor Oliver P. Morton donated land to Indianapolis, now known as Military Park, for recreational use. This became the city of Indianapolis’s first park. In the late 1800s, the city council launched a program to purchase park space and in 1870, the city purchased Brookside Park as its first purchase. The city was greatly influenced by George Kessler, a landscape architect who was schooled in the garden beautiful movement, and designed Indianapolis’s park and boulevard system starting in 1908. In 1919, the parks system acquired recreation from the city’s health department and in the 1920’s, grew to include 24 parks and over 1,900 acres. Programming, classes and special events began to flourish during this time and park usage began to flourish until the 1960s. Around this time, the population began to shift to the suburbs and the parks department shifted its focus accordingly. In the 1970s, the parks department expanded
to include all of Marion County and then in the 1980s and 1990s, smaller, inner-city parks were phased out to make way for larger, natural landscapes that would become linear parks. In response to a lack of funding for urban parks, the IPF was formed in 1991 to provide private support for parks capital projects and programming.

As a city that is striving to be an example of sustainable, healthy living for the 21st century, Indianapolis has many opportunities to improve. The city’s resilience and ability to adapt to change make it a strong place to create design interventions for an impoverished community.

DEMOGRAPHICS

The demographics of this site make it an ideal place for an urban agricultural intervention. 30% of the population is under 18 years old, and behavioral changes are most embedded during that period. The neighborhood is 58% black and 29% white, with Hispanics and other making up the 14%. The background mentioned that minority communities are much more likely to be food insecure. 63% of the population is of working age and with a 14.3% unemployment rate, many jobs need to be created. 50% of the population makes less than $24,999 in one year. 18.9% of Windsor Village’s population is under the poverty level (Bureau). These statistics provide a bleak outlook on the state of residents in the Windsor Village community. The housing statistics are just as shocking.
Sixty-four percent of the neighborhood is made up of family households, while 61% of those families are single parents, mostly mothers. There are 331 vacant homes in the neighborhood and 840 are occupied. Sixty-six percent of the occupied homes are rented which means that the community is somewhat transient since fewer homes are owned. The housing situation has only worsened in the past decade, but this project has the opportunity to create interventions that revitalize the community and bring people back to Windsor Village.
The Community Context Inventory Map (Figure 11) examines land uses surrounding the park and neighborhood and helps to determine needs of the community. In this map, the stars are representative of churches, and the dark purple is for single family residential housing. The lighter purple represents the dense residential apartment complexes, while the blue is commercial. Dark green represents park spaces outside of the site of Windsor Village Park, highlighted by a dark blue outline.

Figure 11 - Community Context Inventory
These maps (Figures 12 and 13) explain the existing site layout. These are important because they will inform what the strengths and weaknesses of the site are.

Figure 12 - Windsor Village Park Site Plan (Department)

Figure 13 - Survey of area based on site visit
1941 – 1956 Aerial Photos

The aerial photography from GIS, Figures 15 and 16, shows the census tract pre and post development.

These maps illustrate the history of the community as an industrial one to supply workers to the factory directly to the south.
Foreclosures Map

Figure 16 illustrates the negative economic affect the recent foreclosure crisis and recession has had upon Windsor Village neighborhood between 2007 and 2009. The 170 foreclosures were concentrated on the western side but evenly spread about with the exception of the large clusters on the southern edge of the site where many adjacent vacancies have urban agricultural potential. Not every foreclosed home is now vacant, however, so it is important to examine the vacancy map (Figure 17), as well.
Vacant Parcels Map

This map shows the parcels vacant in the neighborhood, as well as city-owned and section 8 housing. This clearly indicates the need for neighborhood revitalization to bring more residents back to Windsor Village. There are many clusters of 3-5 adjacent vacancies with potential for urban agriculture interventions in the form of community gardens and food centers.

Figure 17 - Vacant Parcels in Windsor Village
Figure 18 illustrates how the public transit has stops along the southern and western edge of the community, on 21st and N. Arlington Avenues. This means that it is more difficult for those located closer to the park to walk to these stops as it would be greater than a quarter mile for many. A bike share located at the community center in Windsor Village park could be utilized to increase access to public transit and physical health. Many of the bus stops are located near vacant parcels and so there is a possibility that revitalizing those places would increase public transit usage.
Topography and floodplain Map

This map, Figure 19, shows the floodplain and topography in the census tract. The highest line on my site is located in the park at 856 with the site sloping towards the west and south with low points at 830 in the south east and 836 to the west. This may seem large, but the slope is gradual at about 0.5%. The neighborhood site does not lie in any floodplain.

Figure 19 - Topography and Floodplain in Census Tract
The figure ground study (Figure 20) shows some of the open spaces available in the neighborhood. There is open space close to the highway and active rail line, as well as found near churches, though often those are parking lots.

Figure 20 - Figure-Ground Study of the Census Tract
Circulation Map

Figure 21, the circulation map, shows the arterial, connector and local streets. The arterial roadway in this area is Interstate 70 East. The large, reddish lines represent the connectors: to the East is Shadeland Ave, the south is 21st Avenue, the west is N. Arlington Ave and to the north is E. 30th St. The local streets, all located within the neighborhood are either black, or orange. The orange are highlighted to illustrate the 3 main access roads to the park. Interstate 70 receives on average 46,930 daily trips by car and 7,560 commercial vehicles according to a counter located at the curve in Interstate 70 (Transportation).
Food Desert Maps

These maps (Figures 22 and 23) illustrate the existence of a food desert in Windsor Village Neighborhood. The first map uses the park as the center of the neighborhood and shows the lack of access to a full service grocery store within 1 mile. The second map shows that no full-service grocery store gives access to the entire Windsor Village neighborhood.
Soil Inventory

The Soil Inventory map (Figure 24) is provided by the USDA and the Natural Resources Conservation Service (NRCS). The soil on site is over 50 percent urban land complexes, Brookston Silty clay loam, and Crosby silt loam. It is clear that soil in some places would require some remediation before integrating urban agricultural intervention.

Figure 24 - Soil Inventory (Service)
Site Analysis

All of the information gathered in the site inventory section culminates in an analysis of the site. Utilizing this data informs the site design by identifying the physical, social, environmental and cultural characteristics of this neighborhood environment. The graphic on page 82 (see Figure 25) illustrates the strengths and weaknesses of the park, as well as the opportunities and threats that this site poses. It is sustainable practice to use existing vegetation and hard-scaping as much as possible to reduce the ecological impact of development. The red and green arrows represent bad and good views, respectively. The large purple circles are nodes where the park interacts with the community. There are many opportunities for growing food in the park landscape and this site analysis helps to identify those areas where the opportunity is most prevalent.

The site inventory and analysis provides the designer with the physical limitations of the site as well as informs the designer about any cultural nuances. This process is essential to good design as it helps to make well considered decisions about the physical characteristics of the built environment, in this case Windsor Village Park. This section clearly demonstrates that Windsor Village Park is a perfect neighborhood setting in which to provide spaces on which to practice urban agriculture. The inventory and analysis is used as a tool to help create a design that better responds to the needs of the site and the neighborhood users.
Figure 25 - Site Analysis
The goals and objectives used to develop the site are based on the research and inventory and analysis processes and reflect the needs of the community and its inhabitants. The goals and objectives helped to refine the vision of the urban agricultural intervention in Windsor Village. They examine how best to integrate the built spaces with urban agricultural designs that increase health and nutrition through increased physical activity and nutrition.
**Goal 1:** Provide access to healthy food for the Windsor Village Community to displace the food desert utilizing public space

- Objective: Provide four season interest and production
- Objective: Integrate produce production areas to offset dietary needs by 5% so as to increase physical access which could offset diabetes and obesity rates in ten years
- Objective: Create site plan for park that successfully integrates urban agriculture
- Objective: Establish areas for produce and seed sales
- Objective: Support a full time park farm manager to harvest food for sale through Community Supported Agriculture.

**Goal 2:** Provide spaces that promote healthy, active living in individuals

- Objective: Produce site designs that allow for both public and private spaces
- Objective: Create designs that reflect the cultural heritage of the neighborhood as well as the agrarian nature of Indiana
- Objective: Create community educational gardens that increase health through active living and nutritious food intake
• Objective: Promote alternative modes of transportation (bicycling and walking)

• Objective: Create food distribution network that utilizes green technologies and transportation systems.

**Goal 3:** Provide spaces that promote a healthy community and social gathering

• Objective: Provides gathering space for harvest celebrations and community activities that includes group plantings and educational opportunities.

• Objective: Create strong connections/gateways that connect users to the Neighborhood Park/communal productive landscape.

• Objective: Provide space for horticultural therapy that encourages community engagement through shared use.

**Goal 4:** Provide design that educates people about food and creates potential for behavioral change

• Objective: Use signage in food production that illustrates the nutritional differences between fresh and processed foods.

• Objective: Create productive landscape that reflects a respect for the environment and its capability for nourishment and provides passive learning.
• Objective: Connect citizens with nature/environment through design of natural habitat

Goal 5: Promote environmental sustainability

• Objective: Use new composting technologies (organic waste, plant and dog waste)

• Objective: Utilize new soil remediation techniques and organic intensive techniques (see Appendix B)

• Objective: Develop a water recycling system that includes stormwater, grey water.

• Objective: Clean and infiltrate stormwater on site

• Objective: Use renewable energies to supply power

• Objective: Utilize existing community center and amenities
**Goal 6:** Provide aesthetically pleasing park plans that promote neighborhood recovery

- Objective: Increase the visual appearance of urban agriculture to sponsor greater stewardship
- Objective: Create plans that educate citizens about the environment, health and food through designs that draw users into the site
- Objective: Use planting pallets that explore the many productive uses of plants and our landscapes

WINDSOR VILLAGE REVITALIZATION PROGRAM

For this project, this program was developed to respond to the needs of the community and best reflect the goals and objectives.

**Community Center** – Existing building contains basketball court, kitchen, computer room, exercise room, bathrooms and younger kids’ area. It serves an average of 100 - 150 kids per day.

- Store/Seedbank
- Greenhouse - To start seedlings and educate
- Outdoor Kitchen and patio area
- Green wall – Reduces energy use for the community center, as well as provides more habitat for birds and insects
- Green Billboard – Green wall with electronic billboard encased broadcasting images of the park and its productive spaces to advertise for the community and its park on Interstate 70 east. The green wall provides habitat and reduced urban heat island effect around the community center.

- Solar Panels

- Apiary (Bee boxes)

**Park Grounds** – Found on an 8 acre site, these park lands currently offer open space, as well as a shade structure, a basketball court and a walking loop.

- Educational Garden Shed and Stage – allows for class room in inclement weather as well as storage area for farmer. The stage is used for performances and demonstrations during farmers market days and summer nights.

- Educational Gardens – Displays all 10 Vegetable families and allows for education opportunities in science, math, nutrition and environmental stewardship.

- Basketball court – Existing

- Orchard - # trees

- Edible Playground – Mounds with play tubes that allow vines and climbers to grow up vertical trellis

- Row Crop – 0.36 acres

- Mobile Hoop House – 20 x 20 feet

- Mobile Chicken Coop – 10 x 20 feet
- Horticultural Therapy – 2 feet high and 4 feet wide raised garden beds to allow for wheelchair access

- Farmer’s Market – Bollard protected road on south side of site that leads to a permeable grass paver transition to the Educational Gardens

- Bike Share – Station where bikes are communally owned and used to increase health, recreation and access to more public transportation

- Pathway Trellis – Grows food and collects rainwater

- Composting Station – Vermicomposting (fast) and cold composting (slow) techniques

Parking:

- On- Street parking

- On-Site parking

Additional Program Elements:

- Stormwater harvesting: cisterns and greywater filters

- Agricultural Sculpture Garden – Inspired by findings in the neighborhood, old agricultural tools could become the basis for lawn art
The goals and objectives, as well as the program, helped to inform the initial design concepts. The following diagrams and sketches illustrate the conceptual process that identified the needs of the community. The final design was gleaned from insights gathered during this process.
Figure 26 is a diagram developed in the process to examine the many systems that influence the final design outcome. This process helped in determining the spaces needed to adequately address the needs of the community with a design strategy and program that reflects the many processes that occur on an urban agricultural site.
Figure 27 illustrates the connections between matching needs of the community to the programming that is necessary for urban agricultural interventions.
Figure 28 is an examination of the needs of an educational urban farming program. The information that was gleaned from the background research led to this exploration of education in a garden setting. The design is meant to provide opportunities to witness most, if not all of the processes associated with farm and garden education.
INITIAL CONCEPTS – The initial concepts (found on the following pages) examined the forms that could be created on site using the programming. In the first two concepts, the purple circles represent nodes where the community interfaces with the park. The green areas represent areas that could be educational gardens, while the yellow represent productive areas. The green to the upper right (see figures 29 and 30) represents the orchard, while any circle surrounded by a dark purple represent an opportunity for education. Finally, the orange represents play spaces and the blue, aquaponics. The brown circles to the left and top of the drawing in figure 29 represent soil educational opportunities.

The final concept (see Figures 31 and 32) illustrates how the site was laid out for the final design. These drawings allowed the design to be determined by the research and the site analysis. The circulation responds to these drawings and has provided the aesthetic research necessary to complete a final design package. Figure 29 was the first concept and examined how certain spaces revealed by the inventory and analysis could be connected. The process culminated in the final concepts (Figures 31 and 32) created by integrating aspects from each of the first two aspects but simplifying the programming so that the site could retain an open feel, which is so integral to park design. The final concepts allowed for the integration of urban agriculture into the park such that it creates a footprint, but does not destroy any existing program, only enhances it.
Figure 29 - Conceptual Drawing # 1

Figure 30 - Conceptual Drawing # 2
Figure 32 - Conceptual Drawing # 4
DESIGN DEVELOPMENT

These design concepts provided the visual information necessary to complete the final design drawings in plan, perspective and section views. The aesthetic experimentation allowed the site to help design itself by providing a cyclical process which included much iteration. Concept diagrams follow (see Figures 33-36) that help to clarify spatial, as well as productive relationships on site. The food diagram explains how this production system is maintained. The composting diagram explains how waste can be recycled and used to benefit the productive capabilities of the design. The energy diagram illustrates how the site will utilize green technologies, such as wind turbines and solar panels, to help offset the energy needs of the community center. And finally, the water diagram shows how stormwater is filtered and reused on site as grey water or as irrigation water. This dramatically reduces storm water runoff and keeps the water bills low.
Figure 33 - Food Diagram

Food Diagram - The production of food on site is used to feed community residents with excess sold at the Farmer’s Market.
Figure 34 - Compost Diagram

Compost Diagram - Waste is upcycled in composting and used to reinvigorate soils

- Orchard
- Food Waste
- Tree Waste
- Crop Residue
- Compost
  - Row Crops
  - Cold Composting
  - Vermicomposting
Energy Diagram - Solar and Wind Power are harnessed on site to create sustainable energy sources.

Row Crops and Gardens

Photovoltaic Panels

Vertical Axis Wind Turbines

Humans use calories created by food production for energy

The community center and educational garden center use electricity produced from the renewable sources on site.

Figure 35 - Energy Diagram
Figure 36 - Water Diagram

Water Diagram - Permeable pavements and rooftop collection of stormwater is filtered to be reused as grey water and an irrigation source.
DESIGN

The design is a representation of what Windsor Village Park would look like when integrated with urban agriculture. Not only could it retain all its programming functions that currently exist, but could also provide nutritious food and income for many neighborhood residents. There was a need for healthy access to fresh foods and this design allows that. It is, however, maintained almost entirely by a farm manager and volunteers. This allows for the opportunity of having a row crop system that rotates yearly to keep soils strong and healthy, as well as a group of hoop houses in the winter so that the production season can be extended dramatically.

There was a need to educate residents about farming and gardening and so a garden education center is conveniently located next to the community center. The programming that exists has been enhanced by a large orchard with agrarian sculptures and artworks. This, along with an edible play area for kids, provides a backdrop of food in the built environment that will help to increase health and modify poor food behaviors. The following pages show photographs and graphics of the design components that represent the design. These are meant to illustrate the design intent. A more detailed discussion of the design components follows the master plans and enlargement plans found in pages 104 to 106.
Figure 38 - Enlargement plan of outdoor patio and kitchen
Figure 39 - Enlargement Plan of Educational Garden Center
COMPONENTS OF DESIGN

The circulation system on site provides access to all community members. Therefore, the exploration of the site design began with this essential element that brings one into the site and connects users to the many programs offered by this site design. The master plan for the site is located on page 104 (Figure 37).

CIRCULATION AND BIKE SHARE

The path around the site creates a loop that provides many opportunities for increased physical activity. Vehicular access was kept the same to decrease the impact of construction and its cost. A bike share system allows for neighborhood residents to borrow bikes to get around the neighborhood. The farmer has a specially fitted one that allows for the delivery of goods by sustainable transport.

PATHWAY TRELLIS

These trellises shape views and provide comfortable seating for site users. Built with recycled wood and other materials, these trellises are built to provide more ways to grow edible plants, as well as collect rainwater that can be stored and recycled in the gardens and row crops. The sloped overhang with a plexi-glass convex cover drains into a recycled, perforated pipe that slopes towards the ends of the trellis. The water falls
down a rain chain into a sculptural basin near the edge of the trellis where it drains into an underground pipe system that takes it to the cistern.

**FARMERS’ MARKET AND BOLLARDED ENTRANCE**

The Farmers’ Market, located at the southern edge of the site is accessible to farmers by the access road protected by removable bollards. The bollards are shaped like corn to reiterate the agrarian nature of the park. The access road runs adjacent to the permeable grass paver area that separates and serves as the transition space from the road to the educational gardens. The Farmers’ Market is flanked on both sides by flower gardens that are managed by the park farm manager and sold at the market.

**ENTRANCE PLANTINGS AND SIGNAGE**

Native grasses and perennials mark each entrance to the park. These vegetative areas mark the borders of the site, as well as provide aesthetically pleasing entrances to the site that are currently visually boring. A large green trellis that is shaped to reflect the W-V in Windsor Village is used to draw people into the site, grow more food vertically and provide signage of which residents can be proud. The plantings are all described with signs that explain the benefits of using natives and increasing park vegetation to provide greater flora and fauna habitat.
ROW CROPS AND EXISTING SHADE STRUCTURE

On the western edge of the site, just east of the pathway that runs parallel to the edge, are the row crops that will be managed by the park farm manager. The plots are arranged in 25 x 25 foot squares that allow for easier crop rotation practices, as well as the integration of the hoop house and mobile chicken coop into this area. It is 15, 523 square-feet, or about 0.36 acres. This, in addition to the movable planters, educational gardens, and orchard provide more than enough growing space to offset at least one neighborhood residents’ entire yearly diet (Lang). The mobile chicken coop is moved on wheels to allow for fertilization of certain areas that need to be reinvigorated with nutrients which chicken feces can provide. This system of crop rotation and mobile chicken coop will keep the soils here in the best possible condition for continued use of the site for agriculture. The row crops were located in this area to prevent them from overtaking too much open space that the park currently provides which must continue. They were also located here because this side of the park exhibits a severe lack of use outside of the existing shade structure that will be kept.

EDUCATIONAL GARDEN CENTER

Placed in the center of the site (see figure 39) to serve as the site’s focus, the educational center and the surrounding gardens provide the educational backbone of the design. The garden beds are divided into the 10 vegetable families and provide a
multitude of opportunities for food education that integrates math, science and environmental stewardship (see Appendix C for vegetable families). Signage throughout the beds discusses the many nutritional, and sometimes medicinal, properties of many common vegetables and herbs. The structure in the center provides a small seedling growing area, cleaning station, and blackboard and chairs for class exercises. These chairs can also be placed on the southern edge of the educational gardens during farmers markets, festivals and concerts that will take place on the stage on the southern side of the garden center. Fruit and nut trees surround this garden education area and provide shaded spaces where seating areas and picnic tables are located.

COMMUNITY (FOOD) CENTER

The community center will be revitalized by integrating green technologies and vertical growing. The community center will be wrapped in a green wall which will allow for climbing edibles to be planted, such as tomatoes and hops. On top of the community center is the green billboard, which will decrease energy consumption and provide advertising and marketing opportunities for the Neighborhood Park and urban agriculture interventions. Along with solar panels to offset energy consumption, an apiary will also be located on top of the building which will allow for local honey production and consumption. The front of the building will also be retrofitted with a greenhouse where there are already glass windows. This greenhouse will provide the
space for the farm manager to grow seedlings in the early spring, as well as be used for educational experiments. To the southeastern edge of the community center, a bike-share will be located to provide increased access to sustainable transportation for more neighborhood residents. The farmer will use a retrofitted bike to transport the CSA boxes to the residents who have paid for them. The community food store will also be located here, where residents can pick up their CSA boxes or purchase any surplus food.

**OUTDOOR KITCHEN, PATIO, HORTICULTURAL THERAPY AND BASKETBALL COURT**

This area (see Figure 38), located adjacent to the west of the community center helps to integrate the community center and the surrounding landscape. Horticultural therapy beds anchor this area to the south and allows for an increase in intergenerational interaction as it is located close to the basketball courts and the entrance to the community center through which over 100 students pass per day. The outdoor kitchen provides opportunity for cooking education and job training. The patio area is integrated with movable planters for kitchen herbs and vegetables, as well as movable trees to provide shade where needed. The seating areas are also movable to create an extremely flexible space. This patio is located near the basketball court to provide extra space for large neighborhood celebrations and could be covered in a tent if need be.
CHILDREN’S EDIBLE PLAY AREA

The northern edge of the site just adjacent to the patio and basketball court is the play area that contains a traditional playground, newly-designed play tubes and a kids orchard that all integrate food into the idea of play. The play tube area and orchard has playful mounds through which the tubes pass and on top of which vegetables and fruit are grown. This enhances visual and physical access to fresh, healthy foods that result in increased consumption and therefore, increased community health. The children’s orchard leads into the orchard that is managed by the park farm manager.

THE ORCHARD ALLEE

The orchard wraps around the community center and buffers the park from the interstate. This area is enhanced by the integration of art into the landscape. Agricultural sculptures cap the ends of the long alleé that bisects the orchard. There are 56 trees in the orchard which is approximately 2/3 acre, which provide lots of nutrition for the community. Located on the edge of I-70 are vertical wind turbines that collect energy from the interstate that can be utilized on site.
COMPOST STATION

This station allows for two types of composting; cold and vermicomposting. Cold can take up to a year and a half to be ready for use in the soil, while vermicomposting, or using worms to break down organic materials, takes much less time (a few months). This station is an incredibly important educational resource as it shows residents how waste can be turned back into food.

AGRICULTURAL SCULPTURES

The site will be integrated with sculptures, mostly metal, of old or abstract farming equipment. Based on the site inventory, which found many existing homesteads with agriculture or agricultural equipment as sculpture, these will be placed throughout the site in designated areas to provide a spot for reflection or education, as many of these tools are still in usable condition. The integration of art into the park landscape enhances the programming of the park and opens up opportunities for greater user diversity.

MUSHROOM LOGS

These logs, placed to the southwest of the garden education center will be maintained by the park farm manager and used to harvest mushrooms for the
community supported agriculture venture. It is another way that the park can be used for crop productivity to help create a healthier community.

SITE DIAGRAMS

The illustrations on the next two pages are diagrams of different systems on the site. Figure 40 illustrates the productive areas of the site which would provide the food and necessary income to sustain the agri-park. Flowers and native grasses can be harvested and sold at the Farmers market, as well as all the food grown in the row crops and garden education area (though much of this will go to the Community Supported Agriculture program). The fruit and nut trees will also provide produce for the CSA boxes, but also provides additional habitat, along with the native grasses.

Figure 41 shows the circulation and the different hard pavements present on the site, as well as the existing vegetation. Much of the original pathways and vegetation was kept to decrease the ecological impact of such a design intervention. The design attempts to minimize hard surface materials so as to reduce the urban heat island effect. The existing and proposed trees provide greater habitat, as well as shaded areas that keep the area cool and also help reduce urban heat.
Figure 41 - Site Diagrams of Hardscaping and Existing Vegetation
CALCULATIONS

It is essential to understand the economical and nutritional production capabilities of this site. This will help in the search for funding and the feasibility of this study. The calculations explore how much can be produced for the neighborhood and how much the produce could earn.

Population: 2,240 residents in Windsor Village

Currently, only 8.8% of Indiana’s residents eat enough fruits and vegetables (9.5% is the national average) (Prevention, State Indicator Report on Fruits and Vegetables). The objective was to provide enough food to offset the needs of 5% of the community, which means enough space to provide food for 112 people.

According to the Center for Maximum Potential Building Systems, .1 acres are needed for a low-fat vegetarian diet for one person for an entire year (Systems).

This means that 11.2 acres are needed to provide enough nutrition for 5% of the population. This percentage was chosen because it will provide enough food for the entire community for fruit and vegetable consumption to increase to almost 15% which would help decrease diabetes and obesity rates in the next 10 years.

The park provides approximately 1.25 acres of productive space (2/3 acre is orchard) which could then provide enough food for approximately 13 residents of the
community. Based on current prices from the USDA, approximately 28,220 lbs of food could be produced from the park, which is equivalent to $61,549.50 in 2011 (Stewart).

It is clear that this site has great potential for urban agricultural production. The economic proceeds from the row crops can help to pay for the farmer’s employment, as well as provide funding for enhanced programming, such as cooking and canning classes. This information can help to convince investors that an urban agricultural intervention in Windsor Village neighborhood is a feasible way of revitalizing a community. The project enhances not only the built environment, but also social and cultural fabric of the community by providing enhanced opportunity for interactions among all neighborhood residents.
This crop harvest circle (see Figure 42) shows the potential of this site to develop year round production in central Indiana using hoop houses. This chart illustrates many, but not all, of the crops that could be grown year round at Windsor Village Agri-park.
The entrance to Windsor Village (see Figure 43) is marked by a sign that is made out of recycled materials and used as a vertical growing apparatus. With the fruit trees in the parking buffer to the right, it is clear at the entrance that this site is a productive space.

![Figure 43 - View of the Entrance to Windsor Village Park](image)

Figure 43 - View of the Entrance to Windsor Village Park
This aerial perspective (see Figure 44) of the outdoor patio and kitchen area illustrates the potential of the site to increase intergenerational interactions, as well as provide flexible spaces that maximize their potential by producing food and energy. The furnishings include herb and vegetable planters, tables and tree boxes. All of these are movable so that the space can be made to fit any occasion. During large celebrations, the basketball court could even be used to provide extra space, or perhaps a family could rent out the patio area and provide intimate spaces for smaller dinner parties. The roof of the community center will provide marketing and decreased energy consumption through the green wall and billboard, and the solar panels will provide energy for the community center and park.

Figure 44 – Perspective of Outdoor Kitchen and Patio during a summer harvest celebration
The section in Figure 45 shows the orchard and sculptures that will anchor the more secluded back of the community center. Though the Interstate is located directly next to the orchard, the density of the canopy will help to offset or even eliminate any noise concerns. The addition of agrarian-themed art into this landscape will continue the aesthetic that is exhibited in the neighborhood context. It will make stronger the Hoosier connection to an agricultural past.

Figure 45 - Section of Orchard and Artwork
The Green billboard shown in Figure 46 shows the potential of a green wall to integrate existing video billboard technology to advertise the community park as a place that not only provides recreational spaces, but also nutritious food.
The section in Figure 47 illustrates the energy and food systems that are active in the park between Interstate 70 East and the basketball court. Energy will be gathered and conserved through the wind turbines, solar panels and the green billboard. The introduction of more fruit trees, an apiary and edible plantings along the edges of the basketball court not only provide nutritious food, but also help to increase the ecological health of the park.
The section in Figure 48 shows how the edible playground at the north side of the park will physically engage children in the productive capabilities of our landscapes. Beans will cover the large play hexagon so that kids can visually and physically access nutritious food. The play tubes that connect to the hexagon are placed in mounds so that vegetables seem to grow out of the play structures.

Figure 48 - Section of Edible Play Area looking North
The perspective in Figure 49 shows the row crop rotational squares in use during the summer months. The chicken coop will be rotated with hay thrown down before the move so that the hot chicken manure can compost more easily. This, along with the crop rotation, will allow the soil to actually increase its health.
ORGANIZATIONAL STRUCTURE

Windsor Village Agri-Park requires at least 1 or 2 full-time workers. The planting, harvesting and maintenance of the crops produced in the park will require year-round attention due to the introduction of hoop houses in the winter. Educational and job training classes will be offered by the farm manager, with the idea of providing career skills to those who need it most. Often, ex-convicts are given the opportunity to follow this “green” career path and the farm manager would be responsible for the training of new urban farmers. The paid positions will be funded with the money raised from selling CSA boxes to locals. Those within the community who volunteer at the agri-park will be given discounts or even free produce, depending on the number of hours worked.

This organizational structure will help to foster greater responsibility and stewardship for the local park. Instructional classes about how to grow food on a private lot will help to disseminate productive landscapes throughout the community. These will be offered by the farm manager in addition to classes about food preparation, storage and waste recycling. A compost station will be accessible to the entire community so that waste can be recycled. The farm manager will be responsible for the maintenance of the composting station.

The following is a title and brief description of the different jobs that would need to be filled in order for Windsor village agri-park to be successful.
<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
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<tbody>
<tr>
<td>Farm Manager/ Educator</td>
<td>The farm manager will be responsible for all phases of crop production and management. He/she will be paid a yearly salary to run the productive side of the park, while at the same time providing educational classes about canning, jarring, food preparation, etc. They will also conduct job training classes that will enhance community understanding of food and environmental issues.</td>
</tr>
<tr>
<td>Volunteer Coordinator (Park Manager)</td>
<td>The volunteer coordinator position will most likely be filled by the existing park manager until more funding can be allocated for the hiring of another full-time agri-park worker. This coordinator will gather up lists of locals and other volunteers so that a well-organized network can provide assistance to the farmer every day. This person would also assist the farm manager in the organization and coordination of school field trips, job training classes, and educational classes for the community.</td>
</tr>
<tr>
<td>Volunteers</td>
<td>The volunteers are the backbone of this design and are required to make this a long-lasting venture. They will be members of the immediate community and even those beyond. They will be given discounts on a CSA box dependent upon the amount of time worked each week.</td>
</tr>
</tbody>
</table>

The design and organization of Windsor Village Park have the potential to make this an educational and economic engine that helps to increase nutrition and decrease obesity, diabetes and hunger in the community. Though it would take a large initial investment, the designs here could be maintained through the sale of produce. This has the potential to become a sustainable park that is maintained by those who work directly on site every day. It can become an example of how best to integrate urban agriculture into a typical community park in a way that increases access to fresh foods and increases stewardship for the neighborhood environment among residents.
CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

The exploration of urban agriculture, community health and related concepts helped inform the design of Windsor Village Park. Though urban agriculture typologies vary tremendously, lessons gleaned from urban agriculture in Indianapolis and other cities provided this project with valuable insight into the design of a unique urban park in Indianapolis, Indiana.

Urban agriculture can play a unique role in the revitalization of the health of an urban community physically, environmentally, socially and economically. The risks associated with urban agriculture are offset greatly by the great benefits that urban agriculture provides. The design proposed in this creative project succeeds in addressing most of the goals and objectives prescribed by the research. It successfully
helps to alleviate the food desert, while increasing environmental stewardship, increasing children’s physical and visual access to food growing, and by providing an economic stimulus and increasing social cohesion. The design provides endless opportunities for education and allows for aesthetically pleasing integration of edible plants into the landscape.

The park fails in its objective to offset 5% of the neighborhood’s food needs because of the lack of enough space. The park could provide enough food for 13 people year round, which falls short of the 112 people it would take to reach 5% of the population. However, this provides the opportunity for the study to expand into the community and look at how different community spaces could be utilized for production (see Figure 51). The next step in this study would be to examine the capability of the neighborhood and its vacant and underused spaces to offset the negative effects of the food desert. The vacant spaces add up to approximately 9.5 acres which could be utilized for production. A series of
community gardens and food centers could be located throughout the neighborhood in these areas to supplement income and provide greater nutrition. The 9.5 acres of land could be used to grow enough food for an additional 95 people. This would mean that the objective of reaching 5% is nearly attainable (the study falls short by 4 people).

This does not mean that the park farm does not do a good job of producing food and income for the park manager. At current prices, the orchard and the crops could provide as much as $60,000.00 which would more than pay for the park farm manager position, as well as provide surplus funds for increased educational and recreational programming. Currently, fruit and vegetable consumption is far below the recommended daily servings. Research has shown that increased visual and physical access will increase consumption. Therefore, this agri-park can provide the impetus and education necessary to convert vacant and underused spaces in the community into urban agricultural typologies.

This academic study serves as an educational tool for current and future students, but will also help mature the concepts set forth and show that urban agriculture integrated into park design will facilitate healthier, more sustainable lifestyles. Park design has only recently renewed the idea of these spaces as productive landscapes and it is therefore important to explore the possibilities so that the plan for the built environment is addressing the need to combat the nutrition and health problems affecting the Windsor Village community.
Traditionally, parks have been designed with ideas of resource conservation, storm-water management, easy maintenance, social capital and waste reduction in mind. The integration of agriculture into this urban park brings a new aesthetic to urban green spaces which affect all of the characteristics of good park design in a positive manner. Instead of just looking at how one can conserve and minimize resource use on site, this project proposes that parks departments look at how productive a site can be nutritionally. This project shows that agriculture can be integrated into an urban park without being a detriment to existing structures or programs on site. This project is important to landscape architecture as an academic exploration into the design of urban agriculture and its ability to enhance health and to bring educational value to an impoverished neighborhood in Indianapolis, Indiana.

While this study has been theoretical in nature, it seems prudent that more research be done on the effectiveness of urban agriculture in offsetting malnutrition, diabetes and obesity. While the built environment affects choices and behaviors, it is difficult to more precisely determine the cause of unhealthy behaviors. This study recognizes these limitations, but points to the many successes of different urban agriculture typologies throughout the United States and the world. The study has shown the ability to increase fruit and vegetable consumption, promote healthier spaces, increase economic development and social cohesion, while providing greater habitat for wildlife and protecting the native ecology. Urban parks must play a role in providing healthy nutrition for those most in need because they have secure land tenure
in places where there is very little socio-economic stability. Windsor Village

Revitalization is an example of how landscape architects can play a strong role in
promoting urban agriculture as a new way of creating healthier urban parks and
communities that are aesthetically pleasing.
Works Cited


*Food, Inc.* Dir. Robert Kenner. 2008. DVD.


Appendix A

Windsor Village Park
Fact Sheet

(317) 860-3251 • www.IndyParksFoundation.org
615 N. Alabama St. • Ste. 119 • Indianapolis, IN 46204

Park Location
• 2501 N. Kenyon St.
• Northwest corner of intersection of Kitley Ave. and 25th St.
• Near Shadeland Ave. and Interstate 70
• Indianapolis’ east side
• Warren Township

Current Amenities
• Family center (2,184 square feet, in disrepair)
• Full basketball court
• Playground
• Sprayground
• Picnic shelter
• Picnic tables

The park's current community center is too small and in disrepair.

Current Programming
• Homework assistance for local elementary, junior high and high school students
• Summer basketball league, serving approximately 70 youth ages 10 to 16
• Summer Lunch Program, serving more than 3,000 lunches to youth
• Traveling basketball league, consisting of three teams, ages 10 to 17
• Weekly card games for young adults and adults
• Winter leagues and tournaments, including billiards, ping pong, air hockey and Play Station

Renovation Details
• Family center will be demolished and relocated.
Cost is estimated at $1.8 million.
• Community input from a master planning process will help determine the new building’s design and programming.

Benefits of a New Family Center
• Indy Parks will be able to significantly expand educational, recreational and social opportunities at Windsor Village Park, which serves an estimated 2,100 youth.
• More recreational opportunities will be available year-round for people of all ages.

Community Overview
• Largely a dense, residential community to the south and west of the park
• Interstate 70 borders the northern edge of the park, limiting access to the park from the north
• Largely industrial development north and east of the park and I-70

Local Businesses
Business types within a one-mile radius of Windsor Village Park:
• 87 Services
• 54 Wholesale Trade
• 45 Retail Trade
• 40 Manufacturing
• 32 Construction
• 16 Transportation
• 16 Financial Services
• 9 Government
• 5 Agriculture
• 2 Utilities


Continued...
NEIGHBORHOOD DEMOGRAPHICS

Demographics are based on 2002 data for the area within a 0.4-mile radius of the heart of the neighborhood roughly bordered by Arlington Ave., 21st St., I-70 and the I-70 Shadeland Ave. exit.

Population
2,789

Race
• 33.1% white
• 65.0% black
• 2.0% Hispanic

Age
• 40.3% ages 20 and younger
• 21.6% ages 21 to 59
• 7.8% ages 60 to 84
• 0.4% ages 85 and older

Housing Units
• 1,325 total
• 30.0% owner-occupied
• 49.1% renter-occupied
• 20.9% unoccupied

Household Size
• 54.9% one or two people
• 45.1% three or more people

Source: Applied Geographic Solution, Thousand Cuts, CAPE

ABOUT INDIANAPOLIS PARKS FOUNDATION

General Background
• The Indianapolis Parks Foundation (IPF) was founded as a 501(c)(3), not-for-profit organization in 1991.
• IPF is governed by a volunteer board of trustees.

What We Do
The Indianapolis Parks Foundation is a not-for-profit organization that does three things:
• We secure private funding to support our parks system.
• We help Indy Parks and Recreation build a world-class parks system by providing funding for land acquisitions, park programs, capital improvements and maintenance.
• Our staff, board and volunteers advocate for quality parks and greenspace in Marion County.

To Contribute
Contributions to the Windsor Village Park renovation and other IPF projects are always welcome.
• All donations are tax-deductible to the fullest extent of the law.
• Please direct payment to:
  Indianapolis Parks Foundation
  615 N. Alabama St.
  Ste. 119
  Indianapolis, IN 46204
• Make an online contribution at www.indyParksFoundation.org.
• For questions, please contact Cindy Porter, IPF Executive Director, at (317) 860-3251 or CindyP@icf.org.

Figure 51 - Windsor Village Fact Sheet (Foundation)
Appendix B


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."

– National Organic Standards Board

Foundational Principles and their practices

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<tr>
<th>Biodiversity</th>
<th>Diversification &amp; Integration of Enterprises</th>
<th>Sustainability</th>
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<td>Cover Crops</td>
<td>Animal Manure</td>
<td>Cover Crops</td>
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<tr>
<td>Animal Manure</td>
<td>Intercropping</td>
<td>Intercropping</td>
<td>Composting</td>
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<tr>
<td>Composting</td>
<td>Farmscaping</td>
<td>Biocontrol</td>
<td>Natural Fertilizers</td>
<td>Intercropping</td>
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<tr>
<td>Intercropping</td>
<td>Mulching</td>
<td>Farmscaping</td>
<td>Foliar Fertilizers</td>
<td>Biocontrol</td>
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<tr>
<td>Biocontrol</td>
<td>Animal Manure</td>
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<td>Farmscaping</td>
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<td>Buffers</td>
<td>Mulching</td>
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<td>Tillage</td>
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<td>Buffers</td>
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<td>Fire</td>
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<td>Natural Pesticides</td>
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</tbody>
</table>

General Practices for Organic Farming

- Create fertile, biologically active soil.
- Add composted organic materials to reduce pests & diseases and increase plant resistance
- Use crop rotation for annual vegetables
- Grow plants that suit soil & site
- Start with healthy seed varieties that are resistant to pests & diseases
- Choose planting dates to avoid certain pests & diseases
- To inhibit pests & diseases, keep greenhouses ventilated with good airflow and prune trees and bushes
- Ensure plants get the right amount of water
- Encourage biodiversity so that animals and plants keep pests and disease in check

Land

- Soil fertility, seeds, planting stock, crop rotations and pest management practices must meet organic standards
- Prohibited materials cannot be applied for 3 years prior to harvest of any “organic” crop
- It should be clearly identified as organic

Soil - Containing worms, fungi, bacteria and other microscopic creatures, it is essential to have strong soil structure and fertility. Regeneration of the soil fertility should be done through renewable resources. Farmers build soil through partially decomposed organic matter. This makes nutrients more available, buffers soil pH, improves soil structure, increases biological activity and increases the hydrological function of the soil as well as limiting erosion.

- Know the soil on site
- Grow according to soil conditions
- Use organic methods to improve the soil
- Keep soil covered with plants, cover crops or organic mulch (protects and improves soil structure)
- Grow Green Manures which improve soil structure, add/recycle plant foods
- Maintain soil humus levels by applying compost
- Recycle garden waste by making compost

- **Planned Crop Rotation** can be used to break pest and disease host cycles. This benefits short and long term soil fertility and pest management. Often include forage legumes to provide nitrogen used up by corn.
  - Interval of at least 3 years or more between plants of the same family (or 4-8 years)
  - Use nitrogen fixing green manures in vegetable crop rotation
- **Green Manures and Cover Crops**
  - Green manuring is the process of growing a crop with the purpose of soil improvement.
  - Cover Cropping is growing a crop for soil and nutrient conservation and goes hand in hand with green manuring.
  - Use prior to planting a commercial crop or grow during the offseason or interspersed with the main crop to be more economical.
    - Most desirable when cover crop includes nitrogen-fixing legumes.

- **Nutrient Management**
  - Crop residues, food processing wastes, blood meal, bone meal, and manure (tightly restricted) are available.
  - Most synthetic fertilizers are prohibited by Organic Farming.
  - Instead of synthetic nitrogen (soluble and obtained from natural gas combustion), use nitrogen fixing cover crops and animal manure as compost.
    - Organic nitrogen is less likely to leach, but it is not as readily available to the crop which means slower growth rate, less free nitrogen and less green vegetation.

- **Tillage and Cultivation** – Organic farmers must conserve soil and water. This is helpful for weed control, crop residue management, soil aeration, conservation of manures and other fertilizers, hardpan reduction and increases sanitation by eliminating pest and disease habitats.
  - Danger of Compaction.
  - Organic farmers use minimal tillage equipment such as harrows, spaders, disks, and chisel plows.
Tillage systems that mix subsoil with surface soil causes compaction that creates favorable conditions for disease-causing organisms due to poor air circulation and drainage.

Tillage conserves crop residues and manures in upper, biologically active rhizosphere rather than being buried in anaerobic area deeper in the soil.
- Timing and amount of tilling is a difficult balancing act

Dollar cost of tilling is high, as well as cost to soil and environment by speeding up decomposition of organic bits in the soil (benefits current crop but potentially harms future crops).

- **Mulching** – Traditionally spreading of organic materials over bare soil between plants
  - Straw, old hay, wood chips are often used
  - Organic mulches control soil moisture and temperature, control weeds and introduces organic matter
  - Plastic mulch is permitted, as long as it is removed at the end of harvest season
    - Can increase energy costs since petroleum is used to manufacture it
    - But it allows larger areas to be herbicide-free
  - Fire can be used to destroy weeds as well (thermal/flame weeding)

- **Manure and Compost** (bulky organic soil improvers) – Garden compost and strawy manure made using ‘waste’ materials. Recycling plant and animal waste imitates natural process of nutrient recycling in nature. It is the “decomposition of organic matter through a controlled microbiological process”. Ideally, manures would be part of closed cycle on the farm, but when crops and livestock separate, manures must be imported. There is risk of contaminants since most manure comes from Confined Animal Feeding Operations.
  - Reduces pathogens, destroys weed seeds, decomposes organic matter, and makes nutrients more available
  - Carbon to nitrogen ratio of 25:1-40:1 prior to composting
  - If manure applied without composting, then it must be mixed in with soil and not left on soil surface.
  - Crops with edible portions in contact with soil have a minimum waiting period of 120 days (all other crops must wait 90 days following the incorporation of manure). *Crops cannot be sold as organic otherwise*
  - Plant materials should be composted or left to rot down before use
  - Composting stabilizes material and reduces pathogens and weed seeds
  - Keep heap covered to prevent weed seeds blowing
  - Materials:
- Compost made from weeds and plant residues, kitchen waste, low grade paper, and other household ‘waste’
- Autumn Leaves and Leafmold
- Wood prunings
- Lawn Mowings
- All of the above should come from within individual farm
- Grow Green Manure cover crops
  - Topsoil is acceptable, but not for regular use
  - Animal wastes are difficult to obtain organic certification
    - Well-rotted manures from herbivorous pets can be used
    - Manure needs to be composted or farmer should observe minimum interval between application and harvesting
    - Human manures are expressly forbidden

Fertilizers – Farmer should use organic kinds only when soil or plant deficiency occurs which cannot be remedied by compost. Most often used to correct mineral deficiencies in the soils, ground or powdered rock minerals are applied.

- Supplementary nutrients with nitrogen are often animal or plant products/byproducts
  - Fish emulsion, blood meal, feather meal, bone meal, alfalfa meal and soybean meal.
- Other products – trade off of efficacy and cost should be considered
  - Humates, humic acids, enzymes, catalyst waters, bioactivators, surfactants are acceptable in organic crop production
- Mineral based fertilizers and materials for raising pH (liming) are acceptable, but not for regular use Most commonly used is high calcium aglime. Large amounts of primary (P,K) and/or secondary (Ca, Mg, S) plant nutrients. Most common are rock phosphate, gypsum, limestone, potassium sulfate and magnesium sulfate)
  - Calcium Carbonate (ground limestone) used for raising soil pH
  - Calcium sulphate (gypsum) and limestone balance pH
  - Ground Rock Phosphate
  - Rock Dust
- Liquid feeds do little to encourage soil flora and fauna. Only used in organic farming when grown in a container
- Ashes – from wood ash or crop residues provide economical nutrient source for calcium and potash. (often blended with compost to balance nutrient levels)
- There is a national list of synthetic crop nutrients
Fish, aquatic plant products, elemental sulfur, magnesium sulfate, synthetic micronutrients (cobalt, copper, iron, manganese, molybdenum, selenium and zinc) and chelating agents must be applied according to NOP rules.

- Foliar Fertilization entails spraying nutrients onto plant leaves and stems
  - Soluble fish/seaweed based products, naturally chelated nutrients, humic acid extracts, and teas from plants, dried blood, manure, guano or compost.
  - Not to be used as a substitute for traditional soil building practices.

**Intercropping and Companion Planting**

- The adjacent planting of two or more mutually beneficial plants
  - Increases biodiversity
- Interplanting on a small scale is known as companion planting
  - 3 sisters garden
    - Corn with pole beans and vining squash or pumpkins
      - Beans provide nitrogen, corn provides support for beans and “screens” squash vine borer. The vining squash provides weed suppressing canopy

**Seeds** – organic seeds, plants, tubers and other materials

- Best practices: Use home saved seed from disease free parent plants
  - Home grown transplants
  - Materials from an approved organic certification body
- Non organic seeds can be used in the event that organic seeds are not commercially available (must be documented)
- Annual planting stock must be organically produced
  - Perennial stock from a non-organic source can be transitioned to organic production after 12 months

**Pest & Disease Management** – Prevention is the key to success. Identify cause, decide if any action is needed and then act accordingly.

- Biological and physical methods
  - Encourage biodiversity
  - Identify creatures that help/hurt plants (various predators and parasites can actually reduce insect populations if properly released in time and quantity)
  - Check plants regularly
- Shake plant or spray with water to dislodge pests
- Learn pest/disease lifecycles to develop combat strategies
- Use leaves/comfrey as slug baits/barriers
- Various baits
  - Ammonium carbonate as insect trap
- Lures, traps and repellants (copper bands for slugs/adhesive bands to repel ants in citrus
- Elemental sulfur and lime sulfur on foliage
- Soap widely used for aphids
- Acceptable pest control methods, though not for regular use
  - Plant oils and plant based products with physical action
  - Starch based products
  - Natural pyrethrum products
  - Fatty acid potassium salt soaps
  - Iron phosphate
  - Microbes
- Acceptable disease control methods but not for regular use
  - Potassium bicarbonate
  - Sulphur
- Acceptable rodent control methods, but not for regular use
  - Mouse traps
  - Rodenticide use in tamper proof bait stations (only synthetic one allowed is vitamin D3, aka cholcalciferol)
  - Sulfur smoke bombs used underground
- **Biological Pest Control** – Organic farming needs beneficial insect predators and parasites, pest disease agents, insect eating birds and bats.
  - Can be so effective that no additional action is needed
  - Biocontrol keeps soil fertility high
    - Release control agents like ladybird beetles, lacewings, trichogramma wasps, or weeder geese or goats
  - Growers are designing and building permanent and temporary habitats for beneficial insects/spiders and others. This is known as farmscaping.
- **Sanitation** – Helps to prevent crop pest problems
  - Removal, burning, or deep plowing of crop residues that could carry pests/disease
  - Destruction of weedy habitats that harbor pests
  - Cleaning farm equipment before entering a new field
  - Sterilize pruning tools
- **Biorational Pesticides** – Organically acceptable pesticides fall into 5 classes: Minerals, Botanicals, Soaps, Pheromones, and Biologicals
  - Minerals include sulfur, copper, diatomaceous earth and clay-based materials (Surround)
  - Botanicals include rotenone, neem and pyrethrum (tobacco products prohibited)
  - Commercial soaps are effective as insecticides, herbicides, fungicides and algicides. (NO detergent based products)
  - Pheromones confuse/disrupt pest mating cycles
  - Biologicals use various biological agents (including other insects) to fight off pests/disease

**Raised Beds** – Plants growing in a restricted environment require additional feeding and watering and are more pest/disease prone

- Use organic growing medium
- Use Largest Appropriate Container
- Use homemade paper pots, wooden trays, food stuff and other recycled containers
- Liners made from recycled, biodegradable materials
- Clean containers with steam, hot water, scrubbing and high pressure water (BMP for cleaning greenhouses and other structures)

**Weeds** – This is the single greatest production problem. Most farmers have weed management program centered on tillage/cultivation practices.

- **Clearing Weedy Ground**
  - Cover ground with a mulch
  - Cultivate by hand
  - Use livestock
  - Mow/cut to clear weeds
  - It is acceptable to remove weeds with a mechanical cultivator

- **Mulches for weed control**
  - Recycled plant materials (locally obtained)
  - Cardboard and newspaper
  - Loose mulches with an organic certification
- Loose mulches made from recycled plant materials

**Maintenance**

- Grow groundcovers including green manure
- Use close spacing when appropriate, intercropping, undersowing and strong varieties to slow weed germination and growth
- Hand weed or hoe weeds thoroughly before planting perennials

**Paths/Drives**

- Reduce shade to discourage algae/moss
- Pressure wash
- Constructs paths to prevent weeds growing
- Use them regularly to prevent weeds
- Hoe Gravel

**Biodiversity**

- Recognize that weeds can bring something positive to the farm
- Allow weeds to flourish where they don’t compete with crops

**Lawns**

- Accept some weeds and recognize their benefit
- Amend soil pH to encourage growth
- Choose appropriate grass seeds for location/use
- Don’t cut too short

**Water Use**

- Grow drought tolerant plants where soil is light and drains easily
- Add organic matter to maximize water holding capacity in soil
- Mulch to reduce water loss
- Minimize soil cultivations
- Don’t cut lawn too short
- Allow weeds like clover and yarrow to grow in lawn to keep it green in drought
- Ensure pond liners don’t leak
- Sow or transplant before rain is forecast
- Protect young plants from sun/drying winds
- Collect RAINWATER!!
- Water mainly to establish plants!
- Water the soil, not the foliage.
- If using an irrigation system, use drip rather than sprinklers

Wood use
- Use coppice products from the site
- Choose species more resistant to rotting
- Accept it will rot and replace it when necessary
- Acquire new timber from sustainable sources with accreditation mark to prove it
- Railway ties can be use so long as they’re not treated with creosote or other preservatives

Energy Use
- Build soil fertility by growing nitrogen fixing plants
- Buy second hand, long-lasting tools and recycle them where possible
- Use manual tools (instead of power tools)
- Use solar energy for lighting, water pumps and greenhouse ventilation
- Use non-electric, automatic vents in greenhouse
- Use wood from farm for stakes or supports
- Use a greenhouse where back wall stores solar heat
- Grow seasonally to reduce heating requirements
- Insulate greenhouses
- Use manure based hot beds to allow low level heat for seedlings
- Use cold storage, clamps or other preserving methods
- Use fleece to protect plants in greenhouse from cold/frost
- Use plant-based oils
- Store produce in efficient appliances

Buffers/Barriers – Reduce soil erosion and improve water quality, as well as serving as a beneficial insect habitat.
- Reduce crop contamination from chemicals on adjacent land
- 25 foot buffer is required where borders are “uncontrolled”

**Record Keeping** – Documentation is crucial to establishing the integrity of the product.

**Works Cited**


Appendix C

**Vegetable Families**

<table>
<thead>
<tr>
<th>Botanical Family</th>
<th>Common Name</th>
<th>Edible Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaceae</td>
<td>Allium or Onion family</td>
<td>chives, onions, scallions, shallots, garlic, leeks</td>
</tr>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amaranthaceae or Chenopodiaceae*</td>
<td>Amaranth or Beet family</td>
<td>amaranth, beet, chard, spinach, quinoa</td>
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<tr>
<td>*</td>
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<td></td>
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<tr>
<td>Apiaceae or Umbellifera*</td>
<td>Carrot or Dill family</td>
<td>angelica, anise, caraway, carrot, celery, chervil, cilantro, cumin, dill, fennel, lovage, parsley, parsnip</td>
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<td>*</td>
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<tr>
<td>Asteraceae or, Compositae*</td>
<td>Aster, Daisy, or Sunflower family</td>
<td>artichokes, cardoons, chirocy, endive, escarole, lettuce, raddichio, (sunflowers), jerusalem artichokes</td>
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<tr>
<td>*</td>
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<tr>
<td>Brassicaceae Or Crucifera*</td>
<td>Brassica, Cabbage, or Mustard family</td>
<td>arugula, bok choy, broccoli, brussels sprouts, cabbage, cauliflower, kale, kohlrabi, mustard, radish, rapini, rutabaga, tat sol, turnip</td>
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<tr>
<td>Cucurbitaceae</td>
<td>Cucumber, Gourd, Melon, or Pumpkin family</td>
<td>cucumber, chayote, melon, pumpkin, squash, watermelon</td>
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<td>*</td>
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<tr>
<td>Fabaceae Or Leguminosae*</td>
<td>Legume Family</td>
<td>(beans), peas, (peanuts), fava beans, soybeans, lentils</td>
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<tr>
<td>Lamiaceae</td>
<td>Mint Family</td>
<td>(basil) mint, rosemary, sage, marjoram, oregano, thyme</td>
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<td>*</td>
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<tr>
<td>Poaceae Or Gramineae*</td>
<td>Grass Family</td>
<td>barley, bamboo, corn, rice, rye, sugarcane, wheat</td>
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<tr>
<td>Solanaceae</td>
<td>Nightshade, Potato or Tomato Family</td>
<td>eggplant, (potato), tomato, pepper</td>
</tr>
</tbody>
</table>

* - Cool weather family (can be grown through the winter in Southern California) *(Italics)* are contrary to the rule

Figure 52 - Vegetable Families (Vegetables Only)