Virginia Commons

....where people, plants, and produce converge

SOCIAL SUSTAINABILITY. ECONOMIC SUSTAINABILITY. ENVIRONMENTAL SUSTAINABILITY

Feasibility and Business Planning
for Olcott Park Greenhouse

9th Ave. West 7th St. North
Virginia, Minnesota 55792

University of Minnesota-Duluth
Bureau of Business & Economic Research
1318 Kirby Drive
Duluth, Minnesota 55812
t: 218.726.7281
https://lsbe.d.umn.edu

University of Minnesota-Twin Cities
Center for Sustainable Building Research
1425 University Avenue Southeast, Suite 115
Minneapolis, Minnesota 55455
t: 612.626.2737
www.csbr.umn.edu

CAP is a cross-college, cross-campus University of Minnesota initiative coordinated by the Center for Urban and Regional Affairs (CURA). Funds for CAP were generously provided by the McKnight foundation and the Blandin foundation.

This is a publication of the Center for Urban and Regional Affairs (CURA), which connects the resources of the University of Minnesota with the interests and needs of urban communities and the region for the benefit of all. CURA pursues its urban and regional mission by facilitating and supporting connections between state and local governments, neighborhoods, and nonprofit organizations, and relevant resources at the University, including faculty and students from appropriate campuses, colleges, centers or departments. The content of this report is the responsibility of the author and is not necessarily endorsed by CAP, CURA or the University of Minnesota.

This publication may be available in alternate formats upon request.

Center for Urban and Regional Affairs (CURA)
University of Minnesota
330 HHH Center
301--19th Avenue South
Minneapolis, Minnesota 55455
Phone: (612) 625-1551
Fax: (612) 626-0273
E-mail: cura@umn.edu
Web site: http://www.cura.umn.edu

Acknowledgments

This project would not have been possible without the support of the following individuals and funding we received from their organizations:

Okey Ukaga, Executive Director and Extension Professor
Northeast Minnesota Regional Sustainable Development Partnerships

William Craig
Centre for Urban and Regional Affairs (CURA)/Community Assistance Program
Humphrey Institute University of Minnesota

Jeff Corn
Centre for Urban and Regional Affairs (CURA)/Community Assistance Program
Humphrey Institute University of Minnesota

Our sincere thanks go to City of Virginia officials for their support and collaboration:

John Bachman, Parks and Recreation Director
Dave Koeneman, Greenhouse Employee
Nevada Littlewolf, City Council Member
John Tourville, City Operations Director

We would like to thank all the community members who enthusiastically supported this project, some of whom are mentioned here:

Members of the Friends of the Greenhouse
Members of the Virginia Sustainability Task Force

Paul Monacelli, Marlyn Swanson, Matt Raukar, Carol Raukar, Rob Raplinger, Mary McReynolds, Mary Somnis, Ted Grishaber, Amanda Skorich, Jo Bjerke, Bruce Bjerke, Barbara Baldrica, Judy Schibel, Janine Graham, Charles Soyring, Caroline Soyring, Richard Olson, Norville Peterson, Dawn Trexel, David S. Vuicich, JoAnne Sipola, Cody Robinson, Ardy Nurmi Wilberg, Wayne Wilberg, Mika Wudinich

Finally, we would like to thank the teams at the **Bureau of Business & Economic Research, University of Minnesota-Duluth** and **Center for Sustainable Building Research, University of Minnesota-Twin Cities**, for their dedicated work on this project.

Research Methods

The research methods on this project involved site visits to the Greenhouse and other related facilities, financial and energy data gathering and modeling, conducting focus group meetings with stakeholders, conducting phone interviews, making presentations to City Council and community groups for feedback and compiling a final report of recommendations and findings. The intention of this document is to be a resource and guide for implementation of the specific ideas emerging from the above process. The potential for sustainability of the Greenhouse is very strong, if the right decisions can be made and action taken on the recommendations made in this report.

Contents

Virginia Commons

....where people, plants, and produce converge

Project Partners

Bureau of Business & Economic Research

James A. Skurla, Director
Jean Jacobson, Senior Editor
Taha Kasim, Undergraduate Research Assistant
Brian Resch, Undergraduate Research Assistant
Viki Almquist-Minko, Executive Administrative Assistant

Center for Sustainable Building Research

Virajita Singh, Senior Research Fellow
Dan Handeen, Research Fellow
Erin Stream, Research Assistant for
CURA/Community Assistantship Program (CAP)

Northeast Minnesota Regional Sustainable Development Partnerships

Okey Ukaga, Executive Director and
Extension Professor

City of Virginia

John Bachman, Parks & Recreation Director
Nevada Littlewolf, City Council Member
John Tourville, City Operations Director
Dave Koeneman, Greenhouse Employee

Community

Friends of the Greenhouse, Non-Profit Organization
Virginia Sustainability Task Force
City of Virginia Community Members

Virginia Commons

....where people, plants, and produce converge

Introduction

The Virginia Greenhouse has been a local attraction since 1935. Through the years, citizens and tourists have enjoyed viewing a variety of tropical plants during all seasons, and participated in various community events in the comfort and warmth of this unique green space during the long winter months. The Greenhouse has been an important part of Virginia's history and is one of its legacies from days past. The Greenhouse is owned and operated by the City of Virginia with the active support of a non-profit volunteer group, Friends of the Greenhouse.

The Virginia Greenhouse in its current form has not been economically self-sustaining and has been at risk of closure. The City of Virginia, Friends of the Greenhouse, members of Virginia Sustainability Task Force and members from the larger Virginia community have been interested in proactively examining the issues around the Greenhouse's long-term sustainability. The intention was to find practical solutions for implementation so that this historic amenity might be used to its full potential and continue well into the future.

This project, funded by the Northeast Regional Sustainable Development Partnerships (NERSDP), was framed to examine the feasibility of sustaining the Greenhouse from environmental, social and economic perspectives, and communicate the results to City and community stakeholders. University of Minnesota-Duluth's Bureau of Business and Economic Research (BBER) and University of Minnesota-Twin Cities' Center for Sustainable Building Research (CSBR) collaborated to work with City of Virginia officials and community members to research the context and issues impacting the greenhouse and then propose the recommendations made in this report.

Existing Conditions

Exterior view of conservatory from Olcott Park

Aerial view of Greenhouse

Interior view of Botanical Garden

Interior view of Main Entry

North Greenhouse

The workroom is the staging area to the main botanical garden. Here, the care-taker preps plants and seedlings.

Interior view of South Greenhouse

West Greenhouse

The main botanical garden features exotic plants, not indiginous to the area, and currently serves as the only space in the conservatory where exhibits are open to the public.

Interior view of South Greenhouse

Basement

Composed of solid concrete ceiling/floors, the basement lies beneath the main botantical garden and part of the north greenhouse. Here, the steam system provides occational backup heat to the greenhouses and the nearby city garage. The main heating is done by four gas furnaces.

New copper pipes have been installed that provide irrigation to the botanical garden above.

Proposed Use

1. Prune plants in conservatory greenhouse
2. Create an exterior social gathering space
3. Re-landscape area west of conservatory
4. Introduce community garden plots inside the greenhouse

Business Approach

1. Pursue grants
2. Gather more financial statements and history
3. Pursue leasing option
4. Establish management/leadership
5. Develop contacts and partners
6. Retail plants
7. Begin sustainable building program

Energy & Environment

1. Finish installation of remaining double walled glazing.
2. Seal all drafts and cracks in the greenhouse glazing structures.
3. Insulate along greenhouse foundations.
4. Install geothermal heating system.

Recommendations for Implementation

The following are four recommendations to better utilize space inside and outside the greenhouse:

1. Prune plants in conservatory greenhouse.

Carefully select, thin, and prune plants in conservatory greenhouse to allow easier walking, accessibility, and appreciation of plants.

2. Create a social gathering space

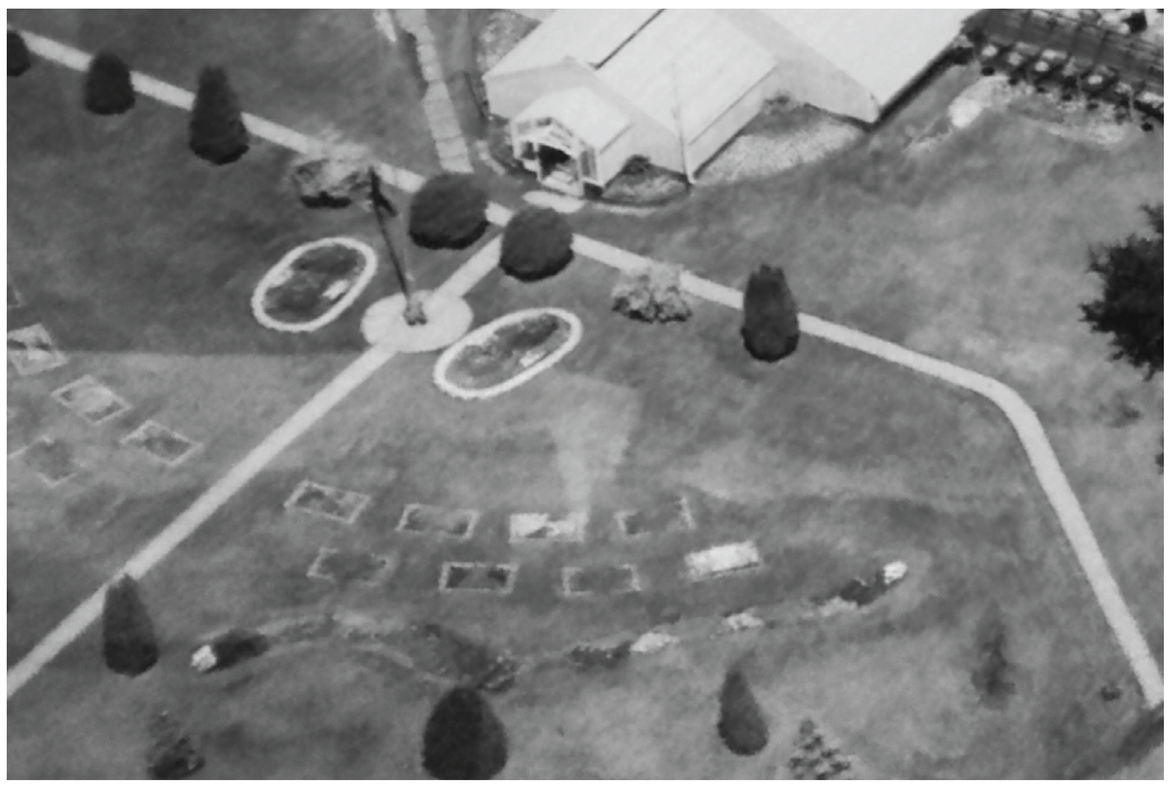
Create a social gathering space in the "entry" greenhouses to create connection with park and outdoor spaces.

3. Re-landscape area west of conservatory

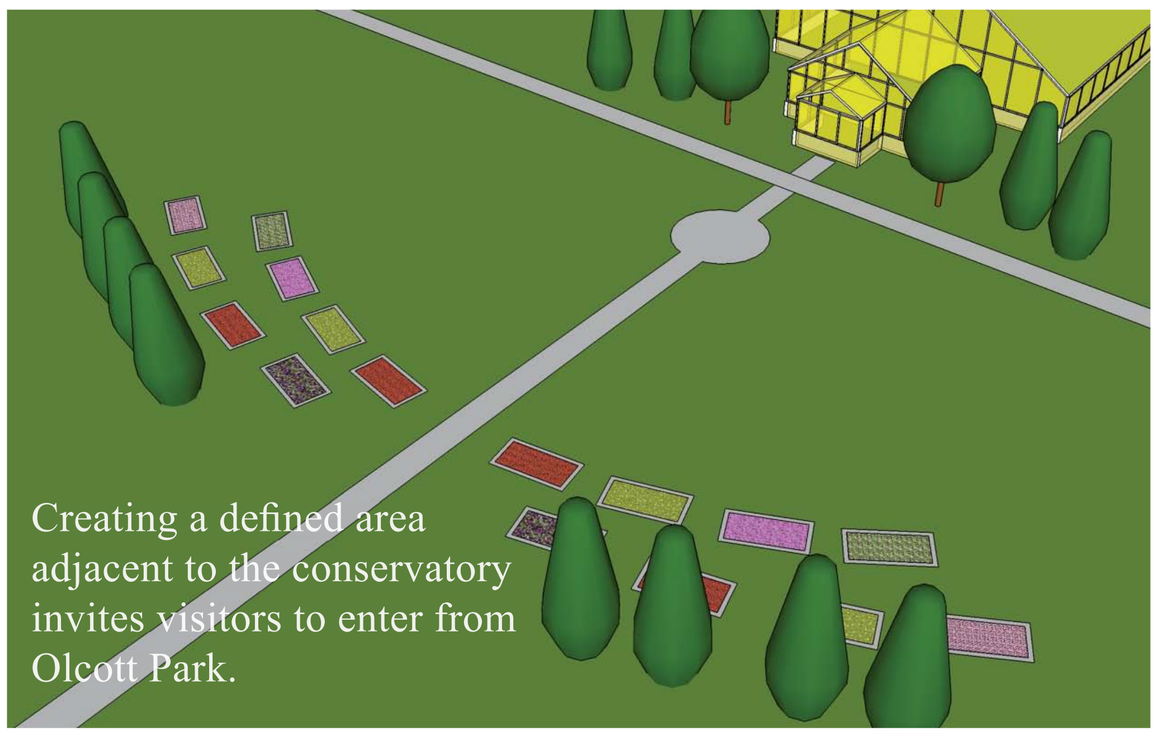
Select and thin plantings and re-landscape area west of conservatory greenhouse to create an outdoor "room" for holding outdoor events such as weddings, receptions, etc.

4. Introduce community garden plots inside the greenhouse.

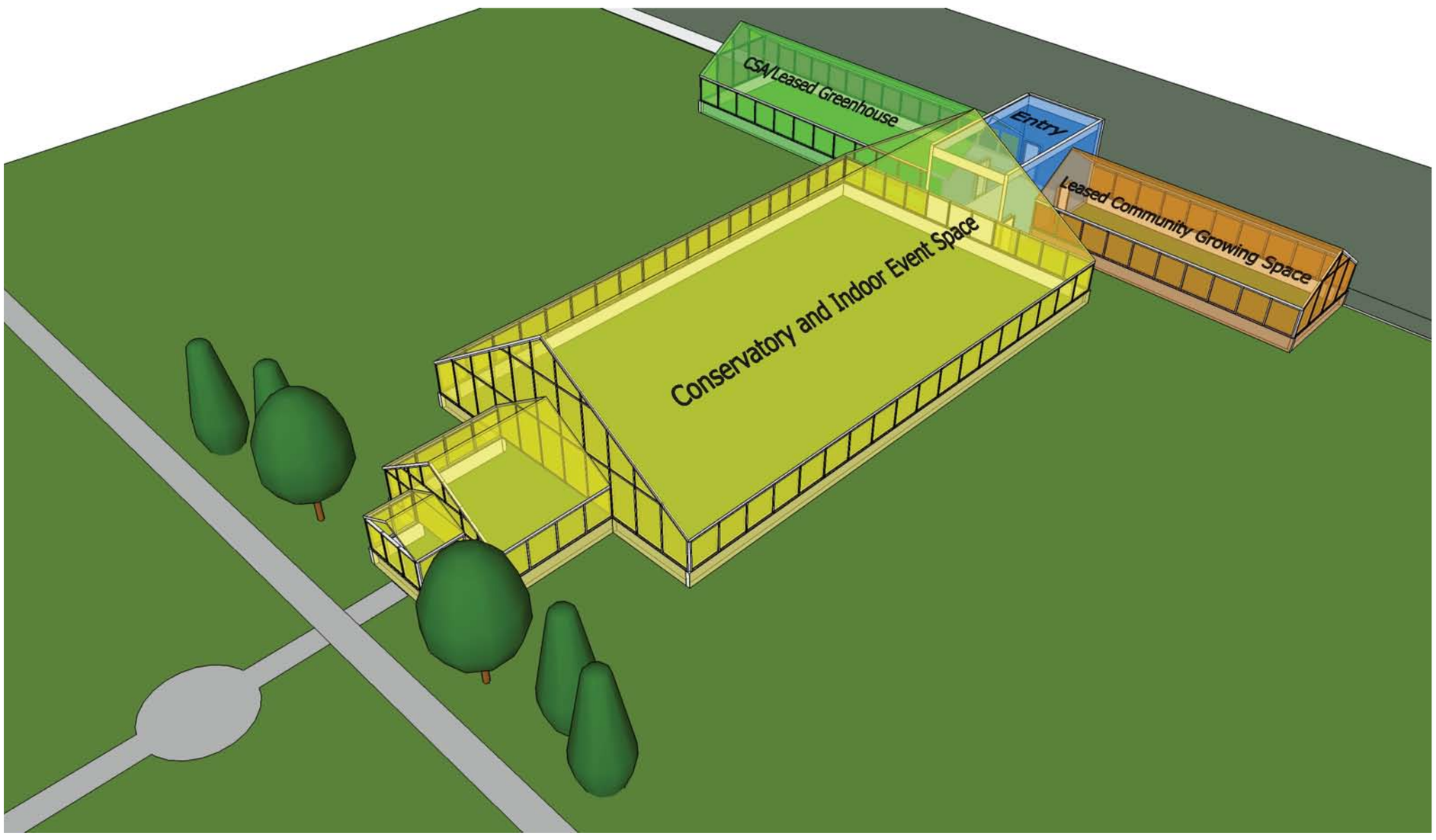
The smaller North and South greenhouses could be opened to provide year-round growing opportunities for community members. This would provide a means of income for the greenhouse's continued operation, as well as a means of food security for the local population. The interior spaces could be divided into plots that would be rented out by gardeners and citizens interested in extending the growing season and starting plants for later transplant.



View of historical Olcott park



View of proposed outdoor "room" to be used for events.



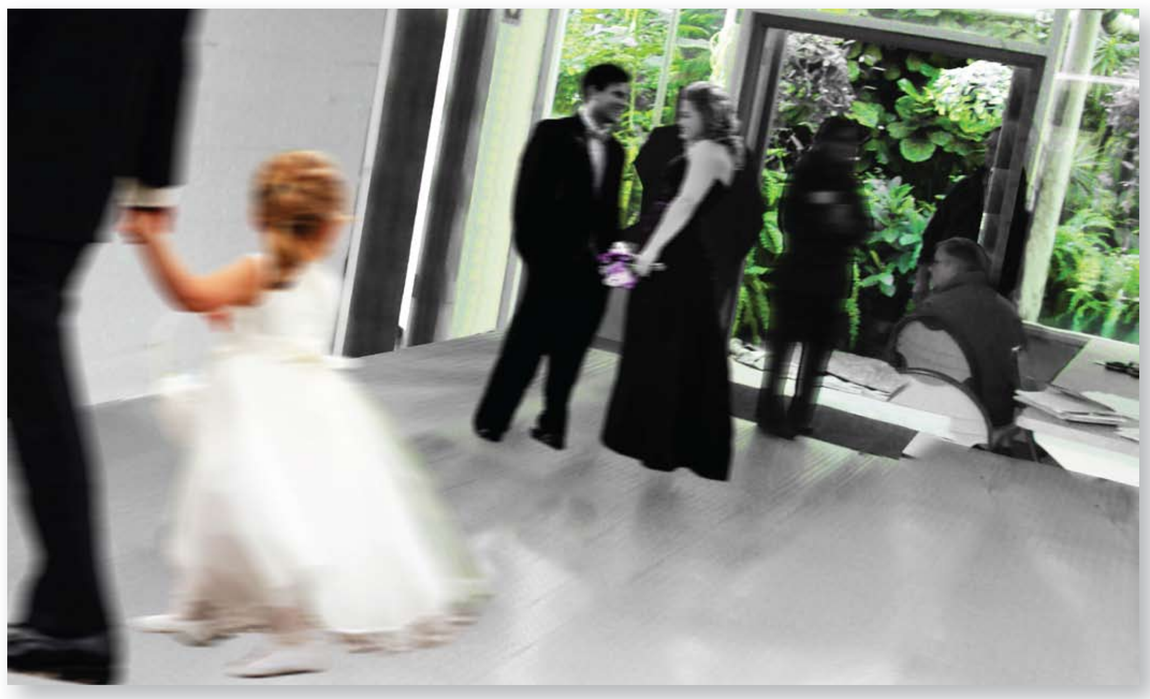
Proposed Use Diagram
Not to Scale

Virginia Commons

....where people, plants, and produce converge

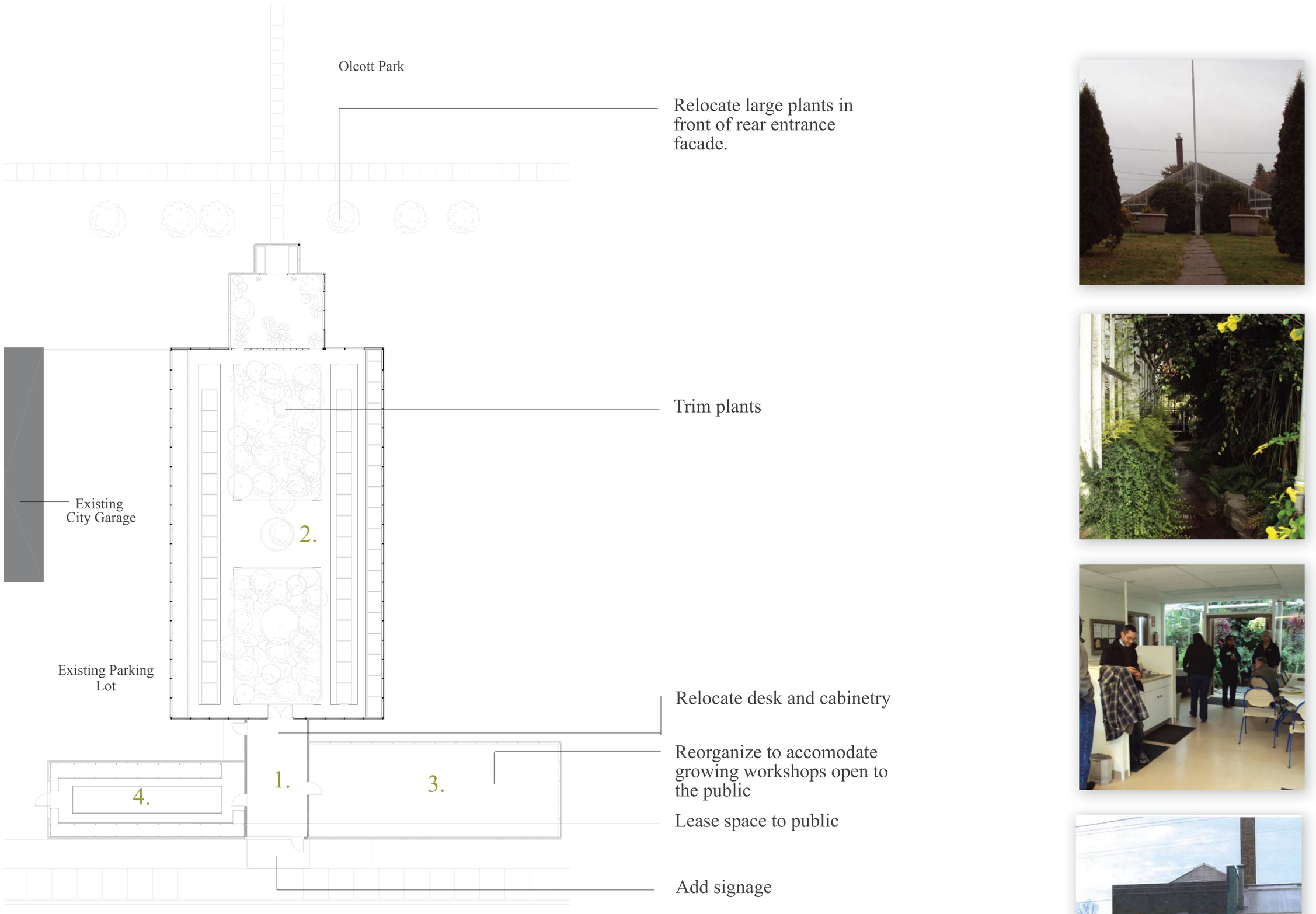
Proposed Use

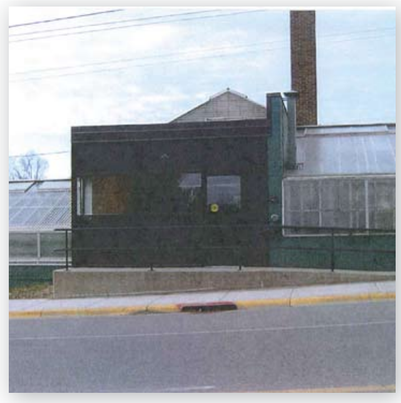
View of exterior “room.”



View of proposed main entry.

1. Main Entry
2. Botanical Conservatory
3. Workshops
4. Leaseable Space





Proposed Main Floor Plan

Not to Scale

Recommendations for Implementation

The following are seven recommendations for planning a financially sustainable greenhouse related business:

1. Pursue grants

The City of Virginia should immediately pursue grants as new support for the greenhouse, including Federal Stimulus funding for sustainable energy projects. By retaining a grant writer to pursue these grants, funding for facility improvements may be obtained to finance the work that has been outlined by the Center for Sustainable Building Research.

2. Gather more financial statements and history

To facilitate writing a greenhouse business plan, Financial Projections Source and Use of Funds Statement, Income Statement, Balance Sheet, Cash Flow, Further 2-Year Projections, Depreciation Calculation are typical records of interest. For business planning purposes, estimates of greenhouse expenses must include labor, benefits, utilities, inventory, and other possible expenses. Break–even calculations or profit statements will depend on many variables, especially the configuration of revenue sources. Once specific commitments on the project are made, the above financial statements should be generated and a business plan made.

3. Pursue leasing option

The City of Virginia should lease all or parts of the greenhouse. A Request for Proposal s (RFP) can be issued to solicit offers from private businesses or nonprofit organizations. This would open up bidding to measure the potential payments and uses for the facility based on which specific decisions about leasing might be made by the City.

4. Establish management/leadership

One option would be to continue the current management/leadership structure and process at the Greenhouse. We hope that the City will be able to identify sources of funding to reinstate staffing lost due to budget cuts to adequately support the Greenhouse operations. In addition, based on community feedback, it is clear that volunteers are also interested to continue participation in the greenhouse and Olcott Park activities. They represent an important social and in-kind monetary asset for the greenhouse, supporting its sustainability. Discussions between the City of Virginia and City employee union about using volunteer and seasonal labor in the greenhouse are ongoing. We hope that a mutually agreeable resolution can reached in the near future so a strategic business plan can be implemented.

Another option would be the creation of a joint partnership agreement with another entity or group. Under this option the City of Virginia would maintain ownership of the property, but operations would be managed by the newly formed group. Revenue sources would include product sales events, memberships, donations and grants. A paid Coordinator position should be created to manage all the revenue sources and direct employees, as well as high school and college students and volunteers.

5. Develop contacts and partners

Under all the options, the City should attempt to partner with Mesabi Community College and use the alternative energy technical training classes to assist in the development of solar and wind applications at the greenhouse. Groups such as The Friends of the Greenhouse and the Sustainable Partnership Task Force should be recognized as key players in the volunteer effort.

6. Retail plants

A further, although less desirable, option would be for the City to initiate a plant and food growing operation. Products could include bedding plants, tree seedlings, vegetables and other retail plants. The markets for the bedding plants might include the City of Virginia itself and other Range cities, as well as the public. Food grown in this way may be sold through a Farmers Market and/or to the local school districts. Tree seedling demand is currently low, but future planting requirements or needs should be monitored and projected demand planned for as an additional opportunity.

7. Begin sustainable building program

Potential revenues and costs based on recommended improvements from CSBR include the following: Energy improvement is the low-cost improvement, and would result in $7,500 in utility cost savings. Under the second improvement recommendation, a geothermal system, costs are to be determined. To implement the recommendation for additional lighting no purchase is necessary because the City of Virginia already possesses fixtures that could be installed to extend the growing season in the individual Greenhouse wings. Elsewhere in this report, the Center for Sustainable Building Research has extended these beginnings with further improvement scenarios.

The legacy of the Olcott Park Greenhouse is apparent to anyone who knows about it. The feat of maintaining a semi-tropical environment at 47 degrees latitude is not an easy feat, and it comes with a cost. The construction of the Olcott Park Greenhouse was funded in a time of relative plenty, when the expense of operating and heating an indoor botanical garden was not an excessive consideration. Times have changed, however, and the ability of the City of Virginia to sustain the operational expenses without income or offset is not tenable.

While there are water fees, sewage fees, and electricity, the great majority (almost 85%) of the greenhouse's operating expenses arise from the cost of heat. According to billing statements from 2008 and 2009, the greenhouse used an average of 24240 therms of gas per year. The average home in Minnesota uses about 1173 therms per year. This means that the greenhouse uses the same amount of gas as over 20 average Minnesota homes!

Recommendations for Implementation

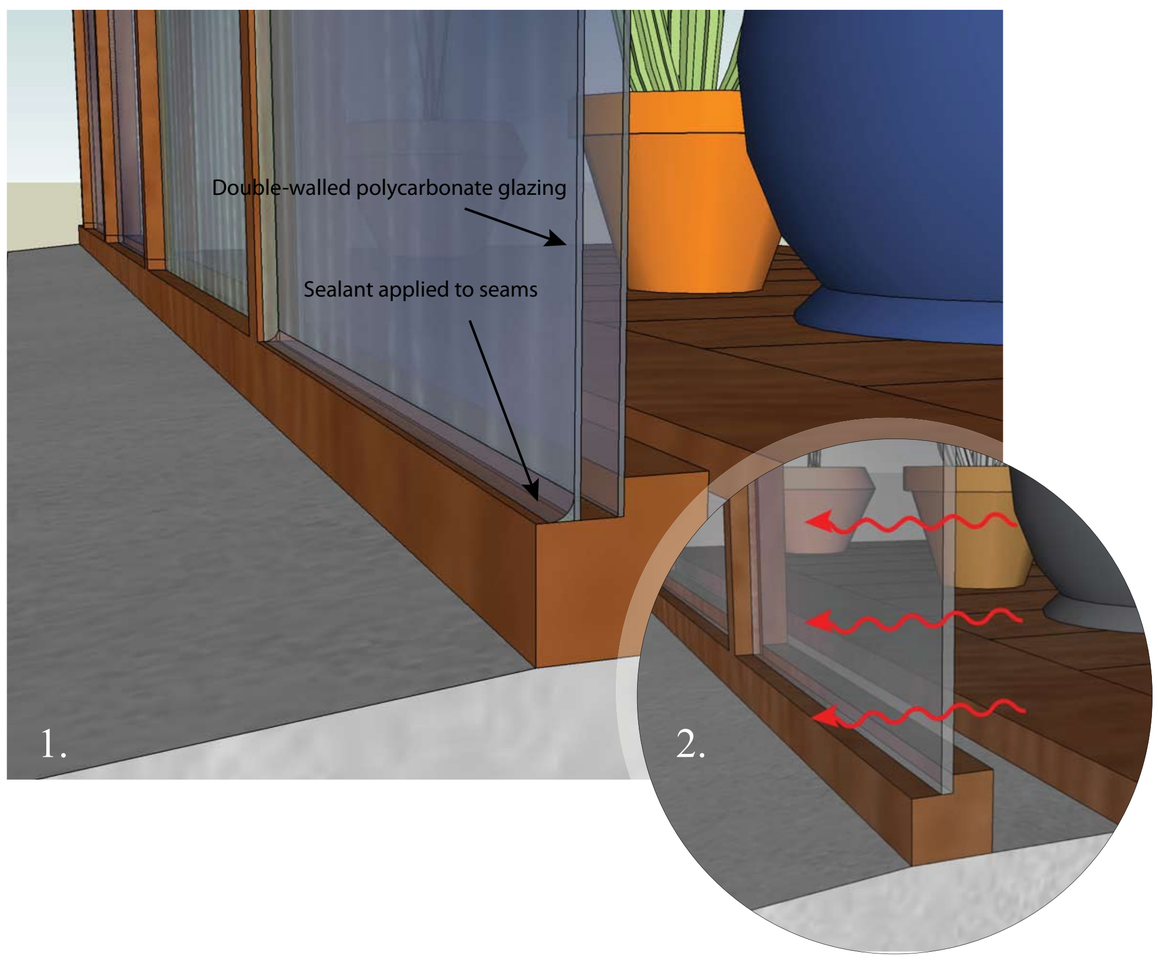
The following is a list of recommendations that will decrease the energy use and operating expenses of the Virginia Greenhouse:

1. Finish installation of remaining double-walled glazing.

A big reason for the high energy use of the greenhouse is because its walls are composed mostly of windows. The greenhouse was built with what were the top-of-the-line materials at the time: A metal structural frame with wooden mullions and single-paned glass. While these materials are beautiful and durable, the associated maintenance is quite intense. The glazers' putty or sealant becomes brittle over time, and needs replacement every 4 to 5 years. On a structure the size of the Virginia Greenhouse, some portion of the glazing would need to be reglazed every year. At some point, some of the glass was replaced with a corrugated fiberglass glazing to reduce maintenance requirements.

In the 1990s, the City started investing in an alternative glazing material which required less maintenance and operating energy. Double-walled polycarbonate glazing system was purchased in order to be installed on the greenhouse. Much of the original glass was replaced.

The main feature of the polycarbonate is that it is produced with a double-walled structure which gives it about twice the insulative capacity of a piece of glass. We suggest replacing any remaining glass or corrugated fiberglass with the double-walled polycarbonate in order to increase the overall insulative capacity of the greenhouses.



Glazing Details

Not to Scale

1. Proposed glazing detail. Heat is retained by using double-paned polycarbonate glazing and sealing the joints.
2. Existing glazing diagram. Heat is lost through the existing single pane glazing and weathered sealant joints.

2. Seal all drafts and cracks in the greenhouse glazing structures.

Besides adequate insulation, the most effective way to retain heat in cold climates is by ensuring that there is control of the air within the structure, and ensuring that unwanted cold air does not get in. The easiest way to do this in an existing structure is by sealing any drafts.

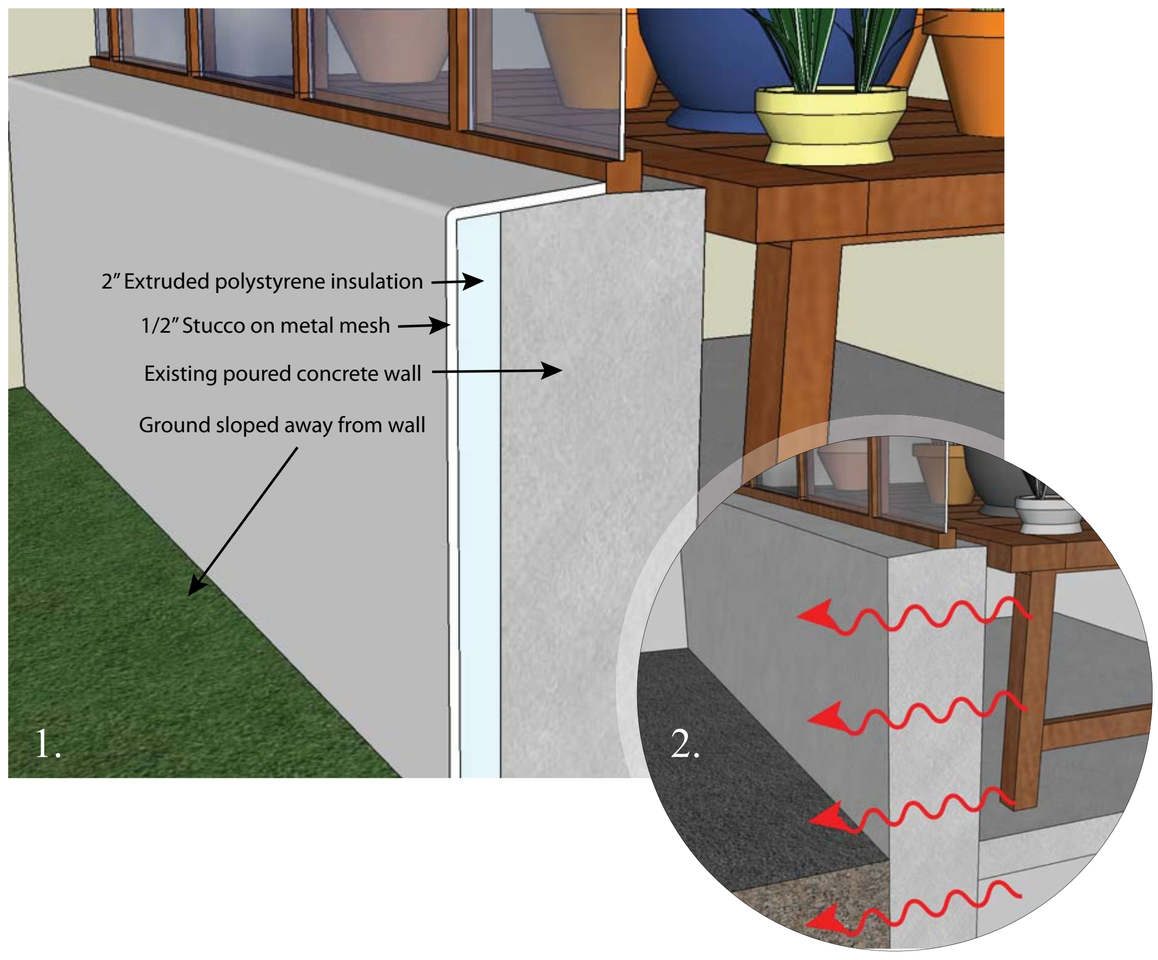
Because of the amount of glazing in the Virginia greenhouse, there are a lot of seams where drafts can occur (and they do). By applying a sealant to any cracks or seams, the amount of unwanted or uncontrolled ventilation will be reduced.

There are many places in the greenhouse where ventilation is required to prevent overheating. Operable louvers and vents are installed on each greenhouse in multiple locations. Unfortunately, while they serve their function well in the summer months, they are a bit leaky during the winter months when the heat needs to be retained.

An extensive weatherization campaign could be undertaken to seal drafts in operable vents and fixed glazing. Energy modeling using Energy-10 indicates that there would be about a 20% reduction in energy usage if the glazing were replaced and weatherization was undertaken. Based on 2008-2009 energy prices, that corresponds to a savings of about $5300.00 per year.

3. Insulate along greenhouse foundations.

The greenhouse loses heat both to the air and to the earth. The existing structure has a concrete foundation with about 10-inch thick walls that extend about 2 feet above grade. There is no insulation on any part of the concrete walls, so it loses heat to the air and to the earth almost constantly. According to the Greenhouse operator, there is about a foot of soft, spongy ground along the exterior perimeter of the greenhouse in the middle of the winter. That basically means that the City of Virginia is heating the earth. Installation of an insulative layer would help further reduce energy consumption by the greenhouse. By excavating along the concrete wall and installing a 2 inch layer of extruded polystyrene foam board (pink or blue board), there is a potential additional 8% decrease in annual heating energy use. The main challenges to adding this insulation is the labor and cost of installation, and ensuring adequate detailing to avoid entrapping moisture within the insulation.



4. Install geothermal heating system.

Since the Virginia Greenhouse has been heating the earth for so long, it may want to try to recoup some of that heat. This is possible through the installation of a geothermal loop and
a heat pump. While this does not reduce the amount of heat the greenhouse requires to operate, it does get it from a cheaper source—The free heat that is stored in the earth. The costs arise from installation of the system and the electrical power that is required to pump and extract heat from the exchange fluid. A system that would meet the greenhouses heating needs would cost around $80,000-$90,000. The drilling of wells or installation of the ground loop would be an additional $10,000-$15,000. Since this heat comes from the earth, there is no burning of fossil fuels, which means a reduced carbon footprint. (Note that some carbon emissions would result from creating the electricity needed to run the pumps and compressors, however)

Fortunately there is some space to the north of the greenhouse that would provide ample room to install a geothermal loop, and there is adequate space in the basement for the pumps and heat exchangers.

Foundation Details

Not to Scale

1. Proposed foundation detail. Additional insulation is required to achieve optimal heat gain.
2. Existing foundation diagram. Heat is lost through the existing, un-insulated, concrete foundation wall.

Appendix

Labovitz School
OF BUSINESS AND ECONOMICS

Bureau of Business and
Economic Research

Consulting Report

Feasibility and Business Planning, Olcott Park Greenhouse, Virginia, Minnesota

January 2010

Sponsored by

NORTHEAST MINNESOTA
REGIONAL SUSTAINABLE DEVELOPMENT PARTNERSHIP

REGIONAL
SUSTAINABLE DEVELOPMENT
PARTNERSHIPS

Communities and their University building Minnesota's future

Research Team

UMD Labovitz School of Business and Economics
Bureau of Business and Economic Research
James A. Skurla, Director
Jean Jacobson, Senior Editor
Taha Kasim, Undergraduate Research Assistant
Brian Resch, Undergraduate Research Assistant
Vickie Almquist-Minko, Executive Administrative Specialist
Bureau of Business and Economic Research
213 Labovitz School of Business and Economics
1318 Kirby Drive
University of Minnesota Duluth
Duluth, MN 55812
(218) 726-8614
http://www.d.umn.edu/lsbe/bber.php

BBER would like to express special thanks to the Friends of the Olcott Park Greenhouse, the Virginia Sustainable Taskforce, and to representatives of the City of Virginia and Members of the City Council for assistance in gathering data. We are also grateful for the continuing help on this project from our project partners, the Center for Sustainable Building Research at the University of Minnesota.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Table of Contents

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Table of Tables

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Project Description

BBER's Deliverables

As part of a grant from Northeast Minnesota Sustainable Development Partnerships, for the project application/action plan worksheet submitted by Tourville, Singh, and Skurla, the Labovitz School's Bureau of Business and Economic Research agreed to study the business feasibility and begin business planning for the Olcott Park Greenhouse in Virginia, Minnesota.

From the business perspective, given the number of possible development ideas that appealed to stakeholders, and the need for leadership and commitment to one proposed business opportunity, BBER determined that although elements of a possible business plan are present, preparing a formal business plan at this point in the development of the Greenhouse is premature. However, BBER has drafted this document to assist stakeholders to plan for an eventual business opportunity.

In this report

To assist with feasibility and business planning for the Olcott Greenhouse, this report presents and compares current, minimum, and projected costs. After considering many options, the University of Minnesota Center for Sustainable Building Research (CSBR) recommended one best scenario for immediately feasible improvements to the Olcott Greenhouse. This report presents a description of that recommendation, and estimates revenues and costs for the recommended improvements. The report also includes estimated capital costs, as well as estimated uses and revenue (ongoing costs).

This report also presents recommendations for implementation of the improvements, which include pursuing grants, pursuing a leasing option, establishing responsible management/leadership, and gathering more financial statements, history and records in order to write a formal business plan. Recommendations also include developing contacts and partners, beginning the sustainable building program, and beginning a retail plant operation.

This report contains several appendices in order to include additional and supporting material. Appendix A provides support for the cost estimates and recommendations and includes a brief discussion of business feasibility considerations, long-term costs, and financial sustainability. Appendix B provides a brief discussion of labor issues and assumptions for the project. Appendix C provides a brief discussion of management issues. Appendix D introduces the process of formal business planning, and presents elements for that process for the Olcott Greenhouse, including Business Opportunities, History and Background, and Marketing ideas. Appendix E presents data on financial planning, greenhouse operations, costs and projections, as well as projected expense scenarios. Appendix F begins the process of networking with contacts that will be increasingly important as the business planning advances. Appendix G presents a sampling of the wealth of comments and suggestions volunteered by the community.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Sources of data for the following tables include the Friends of the Olcott Park Greenhouse; the Virginia Sustainable Taskforce; representatives of the City of Virginia; City of Virginia Department of Parks and Recreation; and Members of the City Council. Estimates where provided are calculated by the Labovitz School research bureau.

Current and Minimum Costs for Operation

Actual Greenhouse Costs

These are estimates for the 2009 costs for the current running of the greenhouse. These costs demonstrate that the facility under the status quo is unsustainable.

Table 1 shows actual costs.

Actual costs include expenses at their current levels which are unsustainable. This describes "just getting by" at the current status quo. Note: Assumptions for these scenarios (which do not include a joint partnership agreement) do not include the cost of the coordinator suggested in the recommendation section of this report.

Table 1. Actual Greenhouse Costs

Greenhouse Expenses	*Actual 2009*
Labor	$47,136
Benefits	$18,850
College Labor	0
Seasonal Labor	0
Volunteers	none
Utilities (projected)	$37,300
Bedding Plants	0
Other (estimated)	$3,100
Total	**$106,386**

Because of budget cuts from the City of Virginia (especially in 2003), staffing for the Greenhouse has been reduced from previous levels. Seasonal part-time workers and college student labor have been eliminated. As a consequence, the Greenhouse has not raised any bedding plants and has been able only to maintain the arboretum at a base minimum level.

This estimate is based on utility projections for 2009, and results in a total cost of $106,386 to operate the Greenhouse with one worker (although hypothetically, unpaid volunteers could also be utilized). In this estimate no maintenance, repairs, or improvements are being done. These are estimates for the

base costs necessary to keep the greenhouse open under the current level of activity.

The one remaining worker is doing flexible hours to cover the Greenhouse duties on a 7-day-a-week basis. This is not sustainable. Additional resources and revenue must be found or the Greenhouse will shut down.

Minimum Costs

Table 2 shows costs included in the minimum level of operation.

Table 2. Minimum Costs

Greenhouse Expenses	*Actual*	*Minimum*
Labor	$47,136	$47,136
Benefits	$18,850	$18,850
College Labor	-	$17,000
Seasonal Labor	-	0
Volunteers	-	none
Utilities (proj.)	$37,300	$37,300
Bedding Plants	-	0
Other (est.)	$3,100	$3,100
Total	**$106,386**	**$123,386**

Minimum costs include adding back the college labor at a cost of $17,000 which increases the cost of operation to $123,386. Again, this estimate assumes that no changes or improvements are made to the facility. This strategy would provide only labor relief to operate the Greenhouse and assumes a low level of activity. In the long-term, additional labor or volunteers should be added or recruited. If volunteers are found, this labor cost could be reduced somewhat. But relying on a completely volunteer workforce may not be practical and would be time-consuming to manage.

Cost of Improvements

Once the greenhouse is supported at a level to keep it open, the following good ideas become feasible.

CSBR Recommended Scenario for the Olcott Greenhouse

One recommended “best” scenario is presented here. This recommendation was selected from three suggested building scenarios which emerged from feasibility discussions with the University of Minnesota Center for Sustainable Building Research and stakeholders. As an outcome of the feasibility

study, the following discussion reviews the most immediately feasible scenario for more business planning activity. Table 3 describes elements of the recommended improvement scenario.

Table 3. CSBR Recommended Improvements Costs Scenario

	Recommendation	*Cost description*
	ENERGY IMPROVEMENTS:	
1)	Finish installation of remaining double-walled glazing. Glazing material is already purchased and on-site. Requires labor to install, and safety considerations.	labor
2)	Seal all drafts and cracks in the greenhouse glazing structures. A very thorough sealing of all glazing. Requires silicone caulk for non-moveable glazing, and gasketing material for vents and moveable glazing.	material investment, labor
3)	Insulate along greenhouse foundations. Add 2" extruded polystyrene on exterior of all concrete above and down to 3’ below grade).	material investment, labor
4)	Install geothermal heating system. Preliminary cost estimate for a 25-ton heat pump is around $80,000., with an additional $10000-$15000 for well drilling and/or loop installation.	material investment, labor
	SITE CONSIDERATIONS TO DEVELOP USAGE POTENTIAL:	
1)	Carefully select, thin, and prune plants in conservatory greenhouse to allow easier walking, accessibility, and appreciation of plants.	labor
2)	Create a social gathering space in the smaller “entry” greenhouses to create connection with park and outdoor spaces.	labor
3)	Select and thin plantings and re-landscape area west of conservatory greenhouse to create an outdoor “room” for holding outdoor events such as weddings, receptions, etc. (CSBR to create drawings to illustrate this)	labor
4)	In order to enable season extension and/or Community Supported Agriculture (CSA) potential, additional light would be required. There are high-power grow lights available for free from local law enforcement. Assuming 300w per fixture, and about 1000 hrs of operation per year, that’s about 300kWh per fixture, or about $20 per fixture per year. The total number of fixtures depends on what is available.	material investment, labor

Estimated Capital Costs

Table 4 shows estimates for itemized capital costs for this proposed improvement scenario.

Table 4. Sources and Uses, Capital Costs of One-Time Expenses*

	Sources	*Uses*	
	ENERGY IMPROVEMENTS:	*material*	*labor*
1)	Finish installation of remaining double-walled glazing.		
	Double walled insulating panels (80 hrs)	(no purchase necessary)	$880
	Insulating panels labor (160 hrs)		$1,760
2)	Seal all drafts and cracks in the greenhouse glazing structures.		
	Glazing and caulks	(no purchase necessary)	
	Glazing and caulks labor	(no purchase necessary)	
3)	Insulate along greenhouse foundations.		
	2" polystyrene above grade and 3" below grade (80 hrs)		$880
	Polystyrene installation labor	(no purchase necessary)	
	INSTALL GEOTHERMAL HEATING SYSTEM:		
1)	Geothermal system	$80,000	
2)	Well drilling (range estimated CSBR)	$10,000-$15,000	
	GREENHOUSE IMPROVEMENTS:		
1)	Add outdoor signs	$100	
2)	Thin and prune conservatory plants (40 hrs)		$440
3)	Create social gathering place in smaller "entry" greenhouse to connect park and outdoor spaces		
4)	Re-landscape and thin plants area west of conservatory for outdoor events (40 hrs)		$440
	Add 300w light fixtures to extend growing season for outdoor events (80 hrs)		$880

*Estimates are based on a flat labor rate of $13/hr; number of hours per task varies.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Estimated Uses and Revenue (On-going Costs)

Table 5 shows estimates for on-going costs included in the recommended improvement scenario. Table 5 is a template to determine the potential revenues and costs based on the three categories of recommended improvement from CSBR. The energy improvement column is the low-cost improvement, and would result in $7,500 in utility cost savings. Under the second improvement category—a geothermal system—costs are to be determined. The additional lighting scenario indicates that no purchase is necessary to improve light fixtures because the City of Virginia already possesses fixtures which could be installed to extend the growing season in the individual Greenhouse wings. In this example 20 fixtures are installed costing $20 per year per fixture.

The Table 5 spreadsheet is intended to be flexible and can be changed and updated when more information or additional features are introduced.

Table 5. Estimated Uses and Revenue (Ongoing Costs)

	Energy Improvements	*Geothermal system*	*Additional lighting*
Greenhouse Revenue			
Product sales	0	Possible source	Possible source
Rental space leases	0	Possible source	Possible source
Event Fees	Possible source	Possible source	Possible source
Grants	Possible source	Possible source	Possible source
Friends of Greenhouse	Varies	Will vary	Will vary
Donations	Varies	Will vary	Will vary
Other	To be determined	To be determined	To be determined
Greenhouse Expenses			
Labor	$47,136	$47,136	$47,136
Benefits	$18,850	$18,850	$18,850
College Labor	$17,000	$17,000	$17,000
Seasonal Labor	$11,440	$11,440	$11,440
Volunteers	0	0	0
Subtotal	$94,426	$94,426	$94,426
Utilities	$29,800	$29,800	$29,800
Geothermal system		To be determined*	
Bedding Plants	0		
Additional lighting (20)	$00.00		$400
Other (est.)	$3,100	$3,100	$3,100
Subtotal	$32,900	$32,900	$33,300
TOTAL	$127,326	$127,326*	$127,726

*See geothermal discussion under “Energy & Environment” section of this document.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Recommended Improvements Costs

An example of adding more labor is shown in Table 4. In this scenario one seasonal worker is hired for six months. This would allow more events and activities to be supported in the recommended design change scenario.

Again, in this recommended scenario as in the previous cost estimates (Actual and Minimum), volunteers could offset some of the shown costs. However, to give a conservative estimation, it is assumed that workers must be paid.

Table 6. Improvements Costs

Greenhouse Expenses	*Actual*	*Minimum*	*Partial*
Labor	$ 47,136	$47,136	$47,136
Benefits	$18,850	$18,850	$18,850
College Labor	-	$17,000	$17,000
Seasonal Labor	-	-	$11,440
Volunteers	-	-	-
Utilities (proj.)	$37,300	$37,300	$37,300
Bedding Plants	-	-	-
Other (est.)	$3,100	$3,100	$3,100
Total	**$106,386**	**$123,386**	**$134,826**

Note: In addition to the Actual, Minimum and Partial costs listed here, a full cost scenario is presented in the appendix. The “Full” scenario estimates the cost of hiring of two seasonal employees for six month period. This describes a scenario in which most recommendations could be supported.

Recommendations for Implementation

The following are seven recommendations for planning a financially sustainable greenhouse related business:

1. *Pursue grants*
   The City of Virginia should immediately pursue grants as new support for the greenhouse, including Federal Stimulus funding for sustainable energy projects. By retaining a grant writer to pursue these grants, funding for facility improvements may be obtained to finance the work that has been outlined by the Center for Sustainable Building Research.

2. *Gather more financial statements and history*
   To facilitate writing a greenhouse business plan, Financial Projections
   Source and Use of Funds Statement, Income Statement, Balance Sheet, Cash Flow, Further 2-Year Projections, Depreciation Calculation are typical records of interest. For business planning purposes, estimates of greenhouse expenses must include labor, benefits, utilities, inventory, and other possible expenses. Break–even calculations or profit statements will depend on many variables, especially the configuration of revenue sources. Once specific commitments on the project are made, the above financial statements should be generated and a business plan made.

3. *Pursue leasing option*
   The City of Virginia should lease all or parts of the greenhouse. A Request for Proposal s (RFP) can be issued to solicit offers from private businesses or nonprofit organizations. This would open up bidding to measure the potential payments and uses for the facility based on which specific decisions about leasing might be made by the City.

4. *Establish management/leadership*
   One option would be to continue the current management/leadership structure and process at the Greenhouse. We hope that the City will be able to identify sources of funding to reinstate staffing lost due to budget cuts to adequately support the Greenhouse operations. In addition, based on community feedback, it is clear that volunteers are also interested to continue participation in the greenhouse and Olcott Park activities. They represent an important social and in-kind monetary asset for the greenhouse, supporting its sustainability. Discussions between the City of Virginia and City employee union about using volunteer and seasonal labor in the greenhouse are ongoing. We hope that a mutually agreeable resolution can reached in the near future so a strategic business plan can be implemented.

   Another option would be the creation of a joint partnership agreement with another entity or group. Under this option the City of Virginia would maintain ownership of the property, but operations would be managed by the newly formed group. Revenue sources would include product sales events, memberships, donations and grants. A paid

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Coordinator position should be created to manage all the revenue sources and direct employees, as well as high school and college students and volunteers.

5. *Develop contacts and partners*
   Under all the options, the City should attempt to partner with Mesabi Community College and use the alternative energy technical training classes to assist in the development of solar and wind applications at the greenhouse. Groups such as The Friends of the Greenhouse and the Sustainable Partnership Task Force should be recognized as key players in the volunteer effort.

6. *Retail plants*
   A further, although less desirable, option would be for the City to initiate a plant and food growing operation. Products could include bedding plants, tree seedlings, vegetables and other retail plants. The markets for the bedding plants might include the City of Virginia itself and other Range cities, as well as the public. Food grown in this way may be sold through a Farmers Market and/or to the local school districts. Tree seedling demand is currently low, but future planting requirements or needs should be monitored and projected demand planned for as an additional opportunity.

7. *Begin sustainable building program*
   Potential revenues and costs based on recommended improvements from CSBR include the following: Energy improvement is the low-cost improvement, and would result in $7,500 in utility cost savings. Under the second improvement recommendation, a geothermal system, costs are to be determined. To implement the recommendation for additional lighting no purchase is necessary because the City of Virginia already possesses fixtures that could be installed to extend the growing season in the individual Greenhouse wings. Elsewhere in this report, the Center for Sustainable Building Research has extended these beginnings with further improvement scenarios.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendices

Appendix A: Business feasibility
- Feasibility considerations
- Long-term costs
- Financial sustainability

Appendix B: Labor assumptions

Appendix C: Management issues

Appendix D: Business planning
- Business opportunities
- History and background
- Marketing

Appendix D: Financial planning, greenhouse operations, costs and projections
- Utilities consumption 2008, 2009
- Utilities costs 2008, 2009
- Projected expense scenarios

Appendix E: Contacts

Appendix F: Comments and Suggestions from the Community

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix A: Business Feasibility

Feasibility Considerations

Long-term Costs

Financial business planning must consider long-term costs of operation, and provide for the economic sustainability of the Olcott Park Greenhouse. The current status of the resources and revenue for the greenhouse indicates that financial sustainability must include reduction in the overall operating cost of the facility through energy efficiency measures. The plan for economic feasibility of operating the greenhouse also must identify future revenue generation.

Financial Sustainability

To achieve financial sustainability the following activities have been suggested as feasible: 1) The improved greenhouse can attract more people to the area; 2) the greenhouse can be an educational model for students and community members; 3) the greenhouse can enhance the communities' knowledge of greenhouse food production in cold climates; and 4) the greenhouse could play a part in mining reforestation efforts to enhance converting barren mine lands to working forests.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix B: Labor Assumptions

The question of union contract labor remains unresolved and presents a situation that requires incorporation in the plan for financial sustainability. Actual expenses at their current levels are unsustainable. A minimum solution to labor costs suggests hiring of college student labor and unpaid volunteers. A partial solution suggests hiring one seasonal employee for a six-month period. A full resolution to labor needs for the greenhouse suggests hiring two seasonal employees for a six-month period. (See Appendix E.) Also noted in feasibility discussions is the need for a coordinator for the project.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix C: Management Issues

Two areas of concern were identified in relation to management: 1) leadership, and 2) public or private domain. It has been suggested that the greenhouse can privatize its operations, wholly or partially. The greenhouse can also remain public. Stakeholders have considered the feasibility of a property lease to a private enterprise, a partnership with a school(s), or a partially privatized configuration. Discussion of management has included the history of the greenhouse partnering arrangements, including the involvement and sponsorship of the mining industry.

Partnering with Colleges/Schools, Community, non-profit groups, can include a relationship with local growers, farmers markets, as well as the aforementioned industry partners.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix D: Business Planning

A traditional business plan covers key areas such as the industry definition, company's legal structure, history, SWOT Analysis, mission, vision, goals, objectives, products/services, customers, competitors, strategies, ownership, operations, personnel, suppliers, technology, financial projections (and associated assumptions), financial statements, first year projected income statement (Monthly), first year projected cash flow statement (Monthly), second and third years projected income statements (Annual), second and third years projected cash flow statements (Annual), beginning balance sheet, and three years ending balance sheets.

As the Olcott Park Greenhouse project progresses, managers of the project can begin business planning with a description of the business operations. The greenhouse business plan will need to include the following elements:

Description of Business:
- Mission and Objectives, Including Proposed Building/Refitting/Expansions

Market Analysis and Strategy:
- Identifying Competition
- Survey of Local Demand
- Identifying Keys to Success

Financial planning for the business can include the following:
- Historical documentation
  - Tax Returns
  - Vendor Income
- Financial Projections
  - Key Assumptions
  - Source and Use of Funds Statement
  - Income Statement, Balance Sheet, Cash Flow
    - Further 2-Year Projections
  - Depreciation calculation

Finally, the business planning process can include consideration of Non-Market Issues. In the case of the Olcott Park Greenhouse, the business plan can document the following:

- Benefits to the Local Community
- Past and Potential Support from the Mining Industry

Although the specific business opportunity for the greenhouse has not yet been determined or committed to, much has been discussed and studied as preliminary planning for the future of the greenhouse.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Virginia Commons

....where people, plants, and produce converge

Business opportunities

Arboretum
Tourist Destination
Community Events
Facility Rental
Botanical Garden Education
Alternative Energy
Wind energy
Solar energy
Geothermal energy
Local Growers connection
Farmers Market
Hydroponic growers
Organic growers
Education partners
Community partners
Non-Profit Groups (for example Natural Harvest Co-op)
Colleges/Schools (cafeteria supply, and volunteering opportunities)
Alternative Energy Construction Technical Program
Botany & Biology Class/Lab

Also offering opportunities will be community events such as Christmas in the Park, Land of the Loon Festival, Earthfest, Flower Shows, Special Garden Displays, Tours, Weddings, Photography events, and Group Facility Rental.

History and Background

Throughout its colorful past the greenhouse has provided the community a valued experience of vegetable and flower gardens, a zoo, a traditional greenhouse, a rock garden feature, special garden events, and winter sports, among other activities, features, and events.

Growing up in Olcott Park by Ardys H. Nelson and Kari Skahill (Cal Creek Publishing, 1998, ISBN: 0966413105) provides a history of the greenhouse. The following timeline of selected activities and events from Nelson's history includes a back-of-the-envelope reckoning of costs as reported in the "Superintendent's Reports" included in Nelson's history. For example:

1907 Cost of operations = $1,019
1915 75 buffaloes @ $300 ea. (75 x $300 = $22,500)
1915 Gardens used to raise vegetables and a zoo opened
1916 Stone entrances constructed at a cost of $1,995
1917 Improvement & repairs = $667.88
1925 Monkey House built 4 wolf pups purchased @ $6 ea. (4 x $6 = $24)
1928 Greenhouse addition - labor and material = $2,581.49; elk and deer hides sold for $722.31
1930 Olcott Park leased by Great Northern Mining Company to Virginia for 10 years
1933 Greenhouse built by Virginia Park Commission at a cost of $2,897.67
1933 Plants in winter = 12,000; in summer = 400,000
1934 C.W.A Federal Grant = $46,773.00
1936 Rock Garden project = $36,005
1936 Budget = $40,000

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

1936	1,100 tuberous rooted begonias, chrysanthemums; attendance = 3,000
1939	30.05 acres of Olcott Park sold to Oliver Iron Mining Company for $9,015
1937	Chrysanthemums = 2,500; attendance = 4,000
1938	140 part-time employees; 8 full-time
1938	New monkey cage constructed; circulating heater installed; ceiling insulated
1939	Electric bill = $4.70
1940	Cash outlay (Iron Bowl) = $35.88; attendance = 1,800
1940	Final payment made
1940	750 gallon water tank mounted; new pumping unit installed
1941	Winter sports equipment = $2,649.40

This history of investment and community and industry sponsorship documents the special place the Olcott Park (including its greenhouse) has achieved in the minds' of Virginia's citizens.

Marketing

The greenhouse business plan will identify potential markets (this study looked at the MN DNR, St. Louis County, tourists, local shoppers, schools, and others) for possible services and commodities such as:

Retail seedlings and plants
Local winter food growing
Tourist destination
Educational facility
Community forum on locally grown food and mining reforestation
Recreational facility
Local food
Learning labs
Greenhouse food production

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix E: Financial Planning, Greenhouse Operations, Costs and Projections

Table 7. Utilities Consumption 2008, 2009

2008	*Steam Heat*	*Gas*	*Water*
Jan	805	2455	9
Feb	505	3625	8
Mar	270	4150	11
Apr	255	3880	11
May	275	2625	13
Jun	280	1785	12
Jul	240	1297	15
Aug	170	535	30
Sep	40	5	28
Oct	45	0	24
Nov	188	740	12
Dec	327	1420	11
Total	3400	22517	184

2009	*Steam Heat*	*Gas*	*Water*
Jan	340	2905	10
Feb	235	4335	10
Mar	225	5100	11
Apr	290	3920	13
May	300	2545	23
Jun	285	1685	13
Jul	295	1025	15
Aug	120	330	17
Sep	50	0	15
Oct	40	0	13
Nov (P)	207	814	13
Dec (P)	360	1562	12
Total (P)	2747	24221	165

The units in the above table for greenhouse utility consumption costs/operations are defined as follows:
Steam units: 1 unit is 100 lbs. of steam; base rate is $1.10 per unit + energy charge
Gas units: 1 units is 100 cu. ft. of gas; base rate is $0.79 per unit + energy charge
Water units: 1 unit is 750 gallons of water; base rate is $1.98 per unit

In 2008, the total steam consumption was 340,000 lbs of steam. For the projected 2009 steam consumption we increased by 10% (preliminary values are shown in red). This table and these calculations should be used to estimate costs and cost reductions for business operations at the greenhouse.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Table 8. Utilities Costs 2008, 2009

2008	*Steam Heat*	*Gas*	*Water*	*Sewage*	*Sales Tax*	*Total*
Jan	$ 1,067	$ 2,774	$ 35	$ 38	$ 251	$ 4,166
Feb	$ 710	$ 4,128	$ 33	$ 24	$ 316	$ 5,211
Mar	$ 402	$ 4,814	$ 39	$ 13	$ 340	$ 5,608
Apr	$ 388	$ 4,614	$ 39	$ 12	$ 327	$ 5,380
May	$ 430	$ 2,957	$ 43	$ 13	$ 221	$ 3,664
Jun	$ 443	$ 2,192	$ 41	$ 13	$ 174	$ 2,862
Jul	$ 387	$ 1,498	$ 47	$ 11	$ 124	$ 2,067
Aug	$ 283	$ 669	$ 77	$ 8	$ 63	$ 1,101
Sep	$ 101	$ 12	$ 73	$ 2	$ 9	$ 196
Oct	$ 108	$ 6	$ 65	$ 2	$ 9	$ 190
Nov	$ 314	$ 802	$ 41	$ 9	$ 74	$ 1,240
Dec	$ 586	$ 1,408	$ 39	$ 15	$ 131	$ 2,179
Total	$ 5,218	$ 25,874	$ 574	$ 160	$ 2,037	$ 33,863

2009	*Steam Heat*	*Gas*	*Water*	*Sewage*	*Sales Tax*	*Total*
Jan	$ 603	$ 3,668	$ 37	$ 16	$ 279	$ 4,603
Feb	$ 441	$ 5,429	$ 40	$ 11	$ 383	$ 6,304
Mar	$ 413	$ 6,423	$ 42	$ 11	$ 446	$ 7,334
Apr	$ 525	$ 4,990	$ 46	$ 14	$ 360	$ 5,934
May	$ 550	$ 3,329	$ 66	$ 14	$ 255	$ 4,214
Jun	$ 496	$ 1,625	$ 46	$ 13	$ 139	$ 2,320
Jul	$ 543	$ 1,027	$ 50	$ 14	$ 104	$ 1,738
Aug	$ 225	$ 373	$ 44	$ 6	$ 42	$ 689
Sep	$ 134	$ 9	$ 50	$ 2	$ 11	$ 207
Oct	$ 116	$ 9	$ 46	$ 2	$ 10	$ 183
Nov (P)	$ -	$ -	$ -	$ -	$ -	$ 1,364
Dec (P)	$ -	$ -	$ -	$ -	$ -	$ 2,397
Total (P)	$ 4,045	$ 26,881	$ 469	$ 102	$ 2,029	$ 37,288

These data and preliminary estimates for 2009 can be used to project further costs for business operations at the greenhouse.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Projected Expense Scenarios

These projected expenses are presented here in relation to the assumption that the City of Virginia will run the greenhouse and will need to anticipate labor costs as the main driver of expenses.

Table 9. Projected Expense Scenarios

Greenhouse Expenses	*Actual*	*Minimum*	*Partial*	*Full*
Labor	$ 47,136	$ 47,136	$ 47,136	$ 47,136
Benefits	$ 18,850	$ 18,850	$ 18,850	$ 18,850
College Labor	-	$ 17,000	$ 17,000	$ 17,000
Seasonal Labor	-	-	$ 11,440	$ 22,880
Volunteers	-	-	-	-
Utilities (proj.)	$ 37,300	$ 37,300	$ 37,300	$ 37,300
Bedding Plants	-	-	-	-
Other (est.)	$ 3,100	$ 3,100	$ 3,100	$ 3,100
Total	**$ 106,386**	**$ 123,386**	**$ 134,826**	**$ 146,266**

Actual: Expenses at their current levels which are unsustainable.

Minimum: Rehiring of college student labor. This describes "just getting by" at the current status quo. Unpaid volunteers could also be utilized.

Partial: Hiring of one seasonal employee for six month period. This represents adding one more worker so the greenhouse could have additional events and increase operations and activities.

Full: Hiring of two seasonal employees for six month period. This describes a scenario in which most recommendations could be supported.

Note: Assumptions for these scenarios (which do not include a joint partnership agreement) do not include the cost of the coordinator suggested in the Recommendation section of this report.

The utility expenses in this table are taken from the total utilities cost in table above. For business planning purposes, estimates of greenhouse expenses must include labor, benefits, utilities, inventory, and other possible expenses. Three possible scenarios for total business expenses are arrayed in this table. Different labor costs are the driving cost for each of these scenarios, and defines the minimum, partial and full expense scenarios. Revenue for the recommendations at the end of this document will largely depend on the labor costs as presented in these three scenarios. Break –even calculations or profit statements will depend on many variables as yet unknown, especially the configuration of revenue sources. These statements can be generated once more commitments have been made.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix F: Contacts

Community contacts:

John Bachman
Jim Skurla
David Koeneman
Nevada Littlewolf
Paul Monacelli
Marlyn Swanson
Matt Raukar
Carol Raukar
Rob Raplinger
Mary McReynolds
Mary Somnis
Ted Grishaber
Amanda Skorich
Jo Bjerke
Bruce Bjerke
Barbara Baldrica
Judy Schibel
Janine Graham
Charles Soyring
Caroline Soyring
Richard Olson
Norville Peterson
Dawn Trexel
David S. Vuicich
JoAnne Sipola
Cody Robinson
Ardy Nurmi Wilberg
Wayne Wilberg
Mika Wudinich

Suggested Contacts for additional Labor/Employment Program Information:

AEOA, Kyle Erickson, (218) 748-2278, Sandy Paskavan, (218) 748-2296, Julie Greenly, 749-2912 ext. 250

Suggested Contacts for additional Local Foods Network Information:

Silver Creek Institute, Cree Bradley, (218) 834-4746
Sustainable Farming Association, Lake Superior Chapter (218) 393-3276
Round River Farm, David Abazs, abazs@lakenet.com

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Appendix G: Selected Comments & Suggestions from the Community

Area citizens accepted the invitation to offer suggestions to save the Greenhouse, published as Greenhouse Future Scrutinized, 'Treasure' Is Costly; Meetings to Focus on Options to Try to Keep Facility Open*, by Bill Hanna, Executive Editor, Mesabi Daily News, Published: Monday, December 14, 2009.*

_____

Noticed this reminder of the environmental $ passed recently. I presume this is for state parks—or could it apply to our city park?

> Minnesota/The Legislature approved projects to protect or restore some 200,000 acres of prairies, forests, wetlands and shoreline along Minnesota's lakes and rivers. The move comes after voters approved a ballot measure in November 2008 that provides sales tax revenue to fund efforts to improve water quality, wildlife habitat, and parks and tails. (See "Vote Yes for Conservation" autumn 2009) The conservancy was instrumental in the campaign to pass the measure, which is the largest public funding initiative for the environment in U.S. history. –*Nature Conservancy*, Winter 2009

If the union stays firm against volunteers, I don't see the sense in spending our $ on insulating or otherwise improving the Greenhouse if there wouldn't be adequate staffing hours. We could spend the $ for summer plants for the Metsa gardens &/or pay a part-time gardener.
The Greenhouse used to have a 1 or 2 day people. They allowed relief for Dave or were needed for special projects. Probably the union would fight that, too.

Childhood memories from the 1950s

An escape, an adventure, a perspective on life away from the usual paths we take each day. The grand trees along the pathways through the park - unusual bark, fantastic leaves. Picnic areas, sitting benches, playgrounds to explore. Sky to dream under, Mother Nature all about. Squirrels and birds everywhere in the shade, the sunlight, up the hill heading north and down the hill heading to the stone castle, where the monkeys were kept in by the moat. They chased and chattered as we children threw them nuts and sandwich crusts. Manicured lawns, floral displays, and the greenhouse. What a wonderful place filled with such wonderous plants. People of all ages enjoying the day at Olcott Park a day trip planned - now called a destination.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Comments on the "Scenarios":

- Additional signage - signs alone won't help with the impersonal aspects inside
- Basic cleaning - why is it so dirty? What do the workers do? See below
- Landscaping - do not *remove* the shrubs but rather trim them. Greenery is essential
- Install the glazing panels that you have. Again what do the workers do?
- Seal windows and door drafts. Right on: "a no brainer"!
- *Lease* garden plots???? No. Let interested volunteers working > 8 hours a week in the summer greenhouse *have* a plot reward them at no expense. If open to the public you invite the hassle of who gets what, payments, allocation of funds, disrespect and theft of plants and so on.
- 20% reduction in energy costs: From 37,288 (est.) To 29,831 I like this.
- Not a great expense, so NO REASON to add solar thermal panels (at est. $10000 + to increase reduction to 28% in Scenario II)
- OR to install night insulation system (at est. $200 - $600,000) with photovolatic system (very spendy) to save 87% on energy in Scenario Ill.
- 87% of $37,288 is a savings of $32,440. You *can't be serious.*
- Expense reduction needs to come from (really high) payroll, not (low) energy costs.
- Reconfiguring workspace in the growing areas may be an excessive endeavor. Wouldn't just clean up and organization be more efficient than an architect and new shelving, etc.???
- Educational programs poo. Make the space fun and inviting... .leaming will occur naturally. See below.
- I would expect that pest management, composting, and using fertilizers (hopefully organic) are already part of operations so why are they a major step-up in Scenario 2?????
- All the capital investments discussed - won't do much if the personal aspects are ignored. I've no doubt that greenhouse operations have been the major focus, perhaps the only focus. Now, in 2010, human relations and resources, creativity, and leadership need to prevail in order to allow continuation of greenhouse operations.
- In my 4 visits over the past 4 years I find these problems:
    - I do not feel welcomed It is not a friendly place Aside from the plants, it is boring in there.
    - There is no invitation or need to come back.
    - It needs an overhaul, to bring back its glory of yesterday at *today's standards.*

I wonder . . .

- What is the accounting for the projected increase in expenses:

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

2009 total expenses:	$106,000	(are the $37,288 energy costs included?)	
2010 projected expenses:			
College labor rehired	$123,386	Increase of	$17,386
College labor and seasonal worker	$134,826	Increase of	$28,826
College labor and 2 seasonal workers	$146,266	Increase of	$40,266

- What rewards are given to the volunteers? Do you have an accomplished, efficient volunteer coordinator? (like at RSVP and the VRMC)
- What will consolidation with the museum or the hospital accomplish as they each have their own troubles and needs?
- What will really stick with the children, excite them, if they come through on a “field trip”, and make them bring their family there for a memorable time? A dry, canned, education thing?
- Why you don’t have a Nursery and sell small pots of plants (the local commercial selection of houseplants is so limited)?
- Do you collect aluminum cans? Do you compost? Do you recycle paper, etc?
- Is a dumpster really needed? Very expensive. Use your truck for a delivery to the dump.

Suggestions:

- Place a “Welcome to Virginia’s Greenhouse - est. 1-8~5”(or whenever) banner on the street side and/or in the vestibule.
- Get the trash cans out of the vestibule. Clean up the “office” - it is cluttered, therefore inefficient.
- Get wireless internet, maybe a TV available with dvds on plants, background music - make the place useful, inviting, entertaining
- Offer beverages other than soda water, juice. Consult with Harvest Food - maybe you could have some of their fabulous food available.
- Involve the greenhouse with the visitor: Workers need to show themselves - talk to me - human contact has no price tag but is so rewarding. Ask me to sign the guest register when I arrive, invite me to comment when I leave. Set out an attractive donation box for a specific purpose - keep me informed of donations so far, and the goal to be reached. Mention future “projects” to give me something to think about. Tell me you are there to answer any questions I may have. Hang a few bells from the ceiling that I Can ring if I need you (you

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

seem to be invisible). Tell me you have an exotic plant sale 2x a year. Teach me how to care for them in my home. Let me come to buy compost - available at $1 a pound year-round. Let me read simple signs by the more exotic plants (name, native land, favorite growing conditions) Tell me how old the trees are (signs by the plants are so limited now). Children love animals: Be an adoption center for the parakeets that people no longer want, so they are not "set free". Let me see/touch/talk to the 3 cats "borrowed" from the Mesabi Humane Society who live at the greenhouse until they find someone to adopt them. Where are the bugs and the bees that help plants? Place 3 small tables with 2 chairs at each at intimate nooks where I may read or think or enjoy my Beverage. Or use my wireless internet connection. Perhaps I would enjoy a "display case" of treasures available at the VRMC gift shop and I would Go there for the purpose of buying something, or to take advantage of their cafeteria offerings. Perhaps I would be excited by a poster/brochure about the museum - and head next door to Delve into the past (they are always friendly and helpful there). Place a wooden swing at one side of the entrance through the park, and a picnic bench at the other Side - invite me, welcome me. The flower gardens are gorgeous, but don't draw me in. Buy 2 heaters from the Amish - extremely efficient and cost effective. Portable, safe, @ $300 each. Shovel the snow up against the foundation to protect against heat loss, and wind chill.

- Give me information: Have a tailgate party in the parking lot of the greenhouse with food and music, games with plants as prizes, tours of the greenhouse, meet the staff and the volunteers, explain your purpose and How you keep the city so pretty. Have a landmark with date (year at least) for photographs - show a bunch of photos from years past. The fountain was our landmark in the '50s, and it's so fun to look back at the photos. Utilize the opportunity coming from the Mesabi Bike Trail a restful haven welcoming bicyclists, giving another perspective on parks and recreation. Be a designated stop-over site, get into The Bike Brochure. (Easy access, toilets, educational, fun for all ages, restaurants near, etc.) I enjoy my visits to the greenhouse - but leave with a feeling that you couldn't care less if I ever came back again.

Building

- Geothermal loop system not a good idea in greenhouse due to messing up the grass and landscaping, 1 well system is better for this location, 5 year payback, Better water for the plants
- Use of steam lines that were recently added to access the hospital; Are these steam lines connected to the greenhouse?
- Need public restrooms, handicap accessibility
- Tony Mancuso, St. Louis County, for expertise and help with lighting, energy efficiency
- #1 Recommendation- Super insulate to decrease boiler use and increase efficiency
- Vermin composting creates heat, Lake Superior College in Duluth does this. They have a small building with wind, solar, geothermal and vermi-composting

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Possible partners

- Contract worker through AEOA, stimulus money, disabled employee programs, grant programs, get on the agenda for AEOA Board
- State horticulture magazine in the cities, master gardeners have contact with them
- Vermilion Community College in Ely has forestry courses
- Grand Rapids Community College has horticulture program
- Mesabi Community College has wind and solar program
- Marketing partners in Laurentian Chamber of Commerce, Giant's Ridge
- Elected officials from across the range (City, County, School Boards, State and Federal)
- Create relationships with news and media

Business Plan

- New sign with firm hours set, open to the public for botanical gardens; Botanical Gardens has been free, but consider charging for entry and at least have a suggested donation amount indicated upon entry, for example: if there are 1000 people that visit the greenhouse every year, each paying $3, there's a $3,000 offset to cost of operating.
- Continuity of volunteer program that is sustainable reliable and ethical is needed; Need to be able to use volunteers for certain things like keeping regular hours and keeping the doors open to the public. We have to consider and respect the union's stance that they do not want to lose unions jobs and seasonal workers. Ideally, we could develop programs that create employment opportunities in partnership with unions. More community ownership and community engagement expressed as wanted by community.

Bureau of Business and Economic Research
Labovitz School of Business and Economics
University of Minnesota Duluth

Virginia Commons

....where people, plants, and produce converge

What is the Virginia Greenhouse Project?

The City of Virginia Greenhouse is owned and operated by the City of Virginia. The City of Virginia is the local government for this Iron Range City with a Mayor, a Council supported by a full-time staff, several citizen commissions, and many volunteer groups.

The Greenhouse has been a local attraction since 1935. Citizens and tourists enjoy viewing a variety of tropical plants during all seasons, and especially the comfort and warmth of this unique green space during the long winter months.

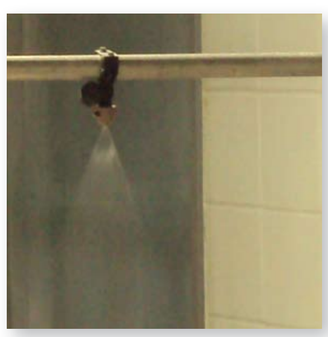
The Virginia Greenhouse in its current form is not economically self-sustaining and is at risk of closure. In addition, it is also operating below standard with regards to energy. Through the Virginia Greenhouse project, research is being conducted to explore options for operating the green house sustainably (economically, environmentally and socially) so that this much-needed amenity can continue well into the future.

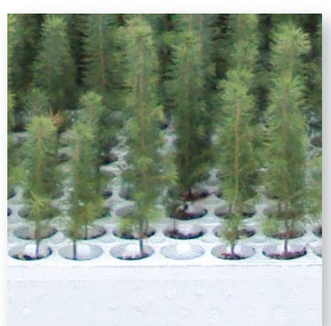
St. Louis County
Minnesota

What can we learn from other greenhouses in the local community?

1. IRRB Mine Reclaimation Growth Chamber

We learn from this growth chamber about the ability of a program to model production efficiency in terms of its process in growing seedlings in record time. We also learn that the demand for seedlings in the area has been tapped by this program.





2. Vern's Greenhouse

From this program we learn the different needs and expectations of a retail, seasonal greenhouse vs. a public, year-round greenhouse. We also learn of the difference in staffing possibilities using students and part-time workers.

What is sustainability?

The Wikipedia definition says it well. Sustainability, in a broad sense, is the capacity to endure. In ecology, the word describes how biological systems remain diverse and productive over time. For humans it is the potential for long-term maintenance of wellbeing, which in turn depends on the wellbeing of the natural world and the responsible use of natural resources.

Social Sustainability.

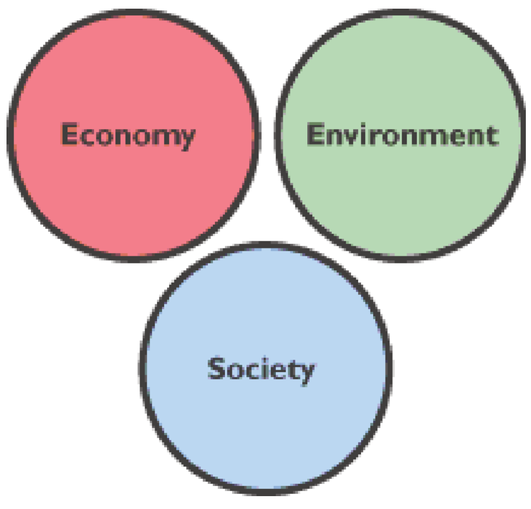
Social sustainability, an aspect of sustainable development, refers to the need to address human rights, labor rights, governance and access even as environmental and economic issues are being addressed.

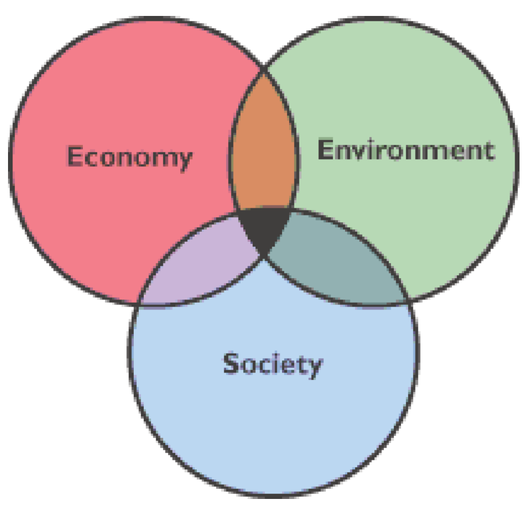
Economic Sustainability.

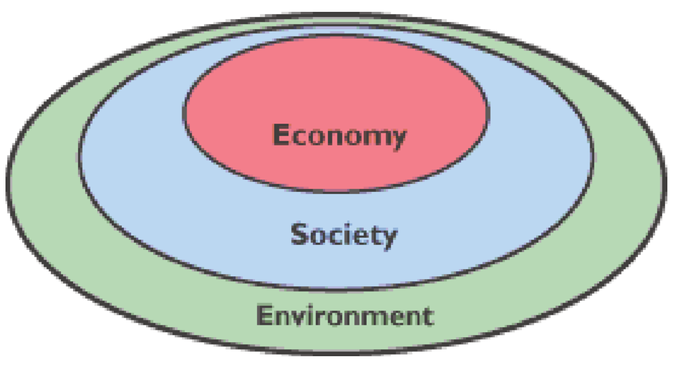
Economic sustainability, an aspect of sustainable development, refers to the need to consider issues of economic viability alongside, rather than at the expense of environmental and social issues.

Environmental Sustainability.

Environmental sustainability, an aspect of sustainable development, refers to the need for long-term sustenance of the ecosystem to meet the needs of future generations.







What is the triple bottom line?

A consideration of ecological and social performance in addition to financial performance refers to the triple bottom line, also known as the 3 “e”s of economy, environment, and equity or the 3 “p”s of people, planet and profit.

Virginia Commons

....where people, plants, and produce converge

Case Study

Jones Valley Urban Farm

Location_ Birmingham, AL
Type_ Urban Community Garden
Organization_ Non-Profit

SOCIAL SUSTAINABILITY

What?

- Educational programs offered to children and adults.
- Provides community outreach.

How?

- Nearly 50 garden plots are open to the community.
- Organic gardening classes offered monthly to the general public.
- Provides pre-kindergarten educational opportunities.
- Agriscience program for high school ages.

Education programs are offered to children and adults.

ECONOMIC SUSTAINABILITY

What?

- Creative self-sustaining practices reduce operating costs.

How?

- Produce supplies the local restaurants, farmers markets, schools, floral distributors, grocery stores.
- Used cooking oil serves as “bio-diesel” to power farm tractors.
- Local restaurants contribute to the compost, which creates fertilizer for the soil.

ENVIRONMENTAL SUSTAINABILITY

What?

- Provides a model of sustainability for the community.
- Reduces Dependence on the water supply system.

How?

- Butterfly roof diverts rainwater to a cistern.
- Collected water is pumped to fields and irrgiates crops.
- Roof angle blocks intense summer sun on the south, while allowing cool northern breezes.

Virginia Commons

....where people, plants, and produce converge

Case Study

Growing Power

Location_ Milwaulkee, WI
Type_ Produce Farms
Organization_ Non Profit,
Land Trust

SOCIAL SUSTAINABILITY

What?

- Develop Community Food Systems.
- Promote local food security.

How?

- The Farm-to-City Market Basket Program offers weekly deliveries throughout Milwaukee, Madison and Chicago from Farms in Milwaukee.
- During winter months, they rely on storage crops such as onions, potatoes, and sweet potatoes, among other sources.

ECONOMIC SUSTAINABILITY

What?

- Market available resources.

How?

- Tilapia and Yellow Perch fertilize crops and herbs through aquaponics. They are hardy fish, easy to maintain, and can be marketed to local restaurants.
- Worm composts can create a rich, organic fertilizer and conditioner to be used in plant beds and sold to the public.

ENVIRONMENTAL SUSTAINABILITY

What?

- Provides a model of sustainability for the community.
- Reduces Dependence on the water supply system.

How?

- Butterfly roof diverts rainwater to a cistern.
- Collected water is pumped to fields and irrgiates crops.
- Roof angle blocks intense summer sun on the south, while allowing cool northern breezes.

Virginia Commons

....where people, plants, and produce converge

Case Study

Willmar Community Greenhouse

Location_ Willmar, MN
Type_ Community Garden
Organization_ Wilmar Senior HIgh School

SOCIAL SUSTAINABILITY

What?

- Willmar High School Students entered the Youth Energy Summit. Their mission was to collaborate with local community groups and businesses to decrease fossil fuel consumption by growing produce locally.

How?

- YES! is a team-oriented youth program that uses hands-on, experiential learning and energy action projects to address energy opportunities and issues in rural Minnesota communities.

ECONOMIC SUSTAINABILITY

What?

- Minimize utility and operational costs.

Produce sold at the local farmers market.

How?

- Produce grown is purchased by local schools, sold to the general public, and donated to the food shelf.
- Students applied for, and received several grants to fund the project.
- Solar panels donated by Minnwest.
- Biomass burner donated by Aquatherm

ENVIRONMENTAL SUSTAINABILITY

What?

- Use available resources.

How?

- Solar panels collect energy from the sun.
- Water filled containers create a thermal mass, lowering heating costs.

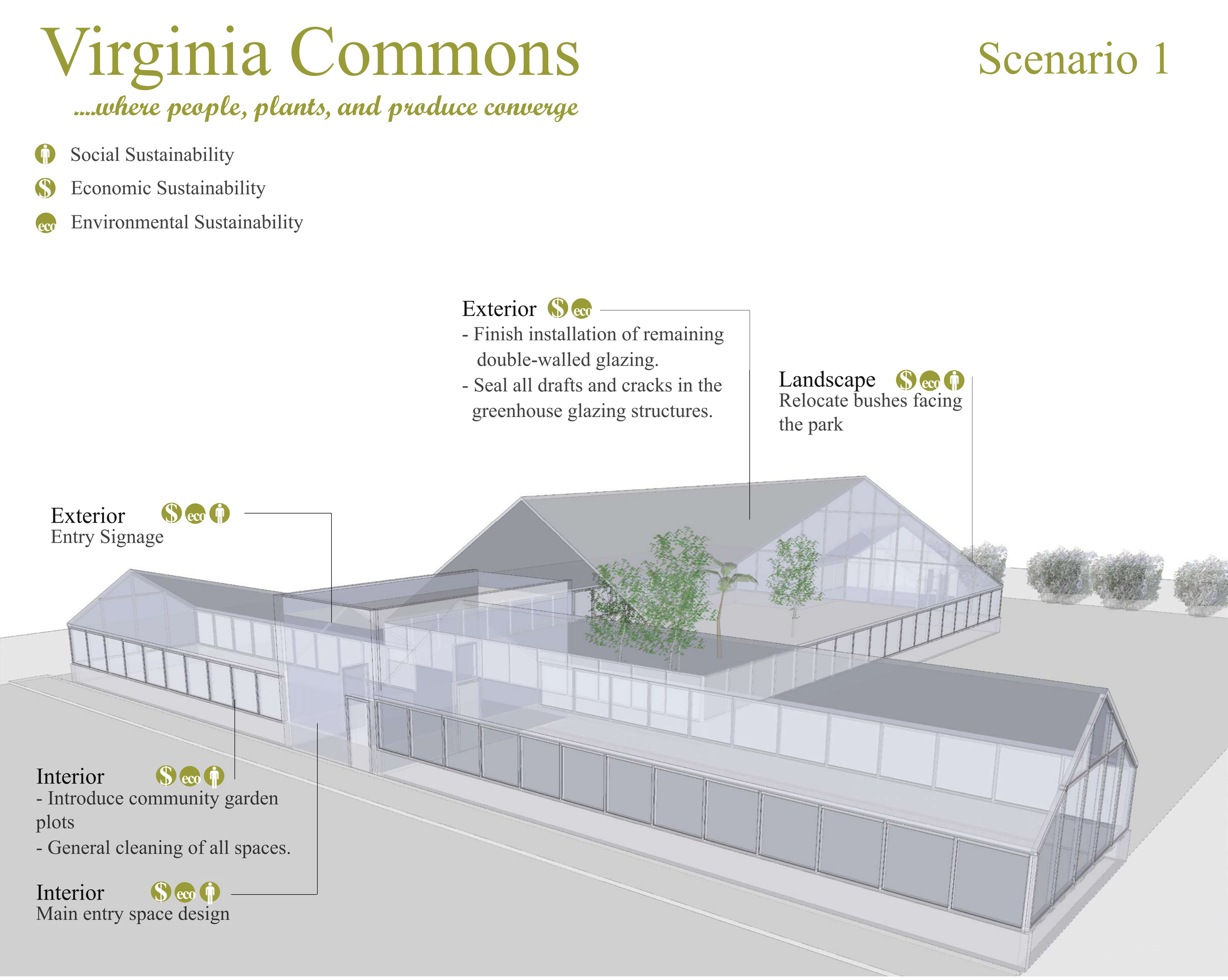
Minnesota Schools Cutting CARBON

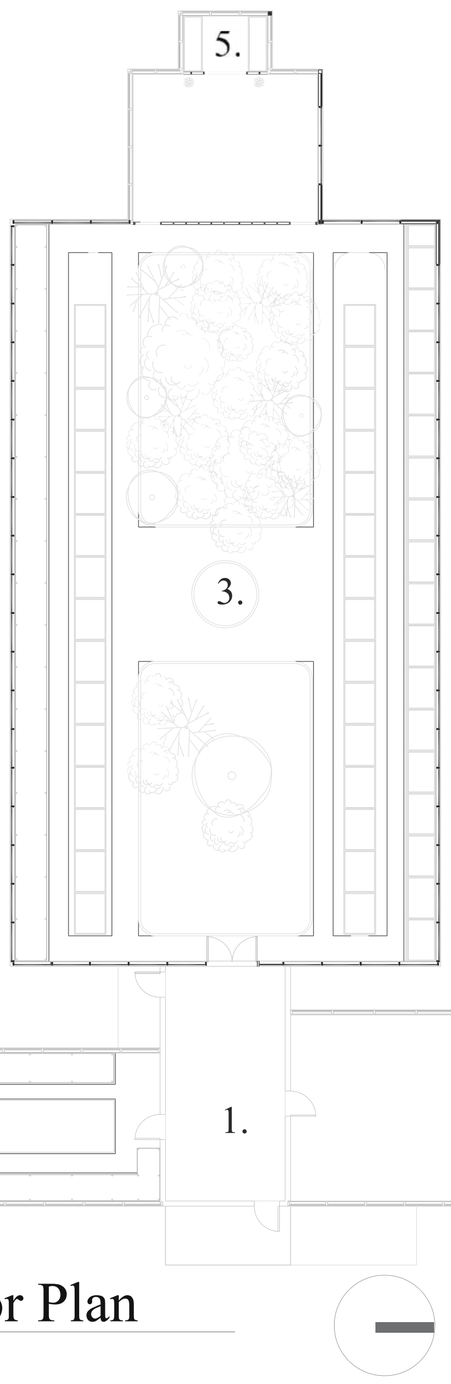
Virginia Commons

....where people, plants, and produce converge

Scenario 1

- Social Sustainability
- Economic Sustainability
- Environmental Sustainability





Main Floor Plan

N

Program Diagram

1. Main Entry
2. Workroom
3. Botanical Garden
4. South Greenhouse
5. Rear Entry

Virginia Commons

....where people, plants, and produce converge

Scenario 2

- Social Sustainability
- Economic Sustainability
- Environmental Sustainability

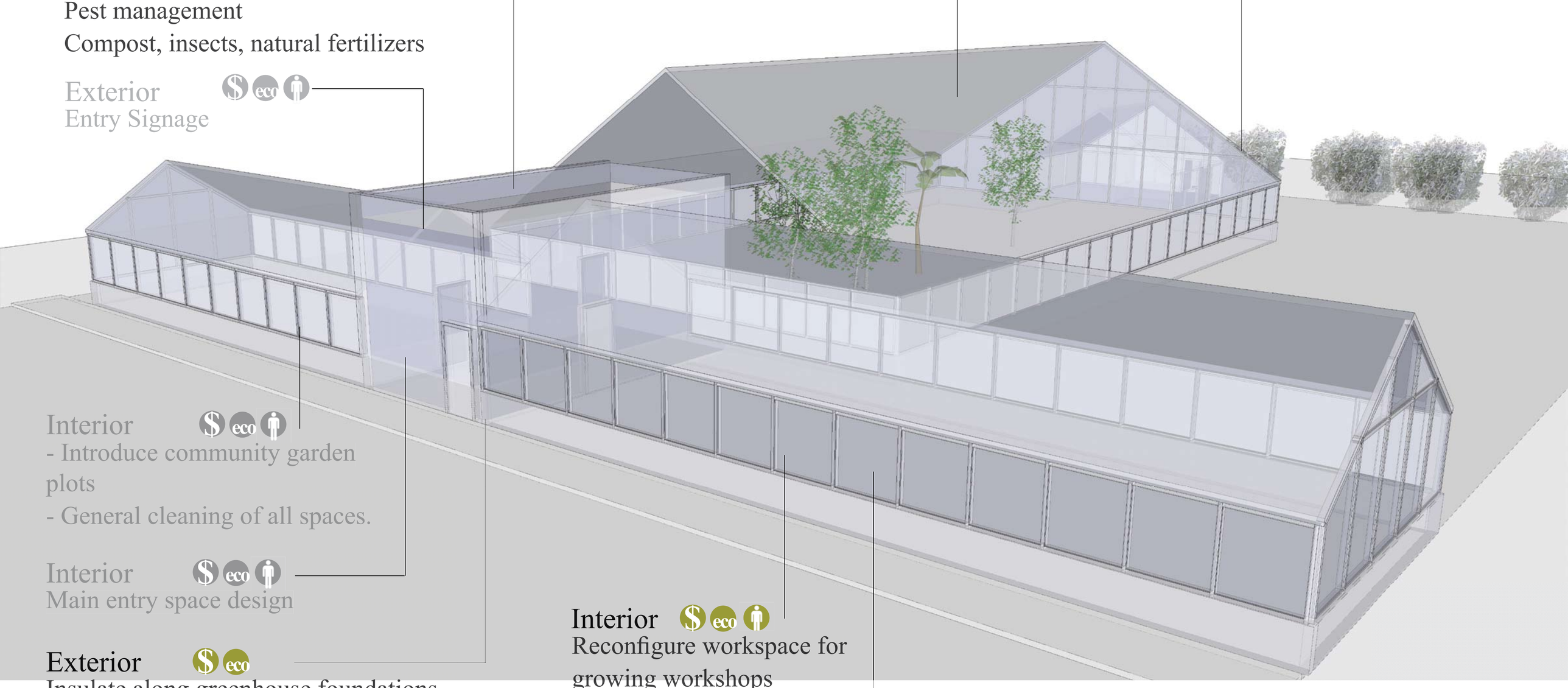
Energy
Add 6 solar thermal panels to roof of office

Interior
Pest management
Compost, insects, natural fertilizers

Exterior
Entry Signage

Exterior
- Finish installation of remaining double-walled glazing.
- Seal all drafts and cracks in the greenhouse glazing structures.

Landscape
Relocate bushes facing the park



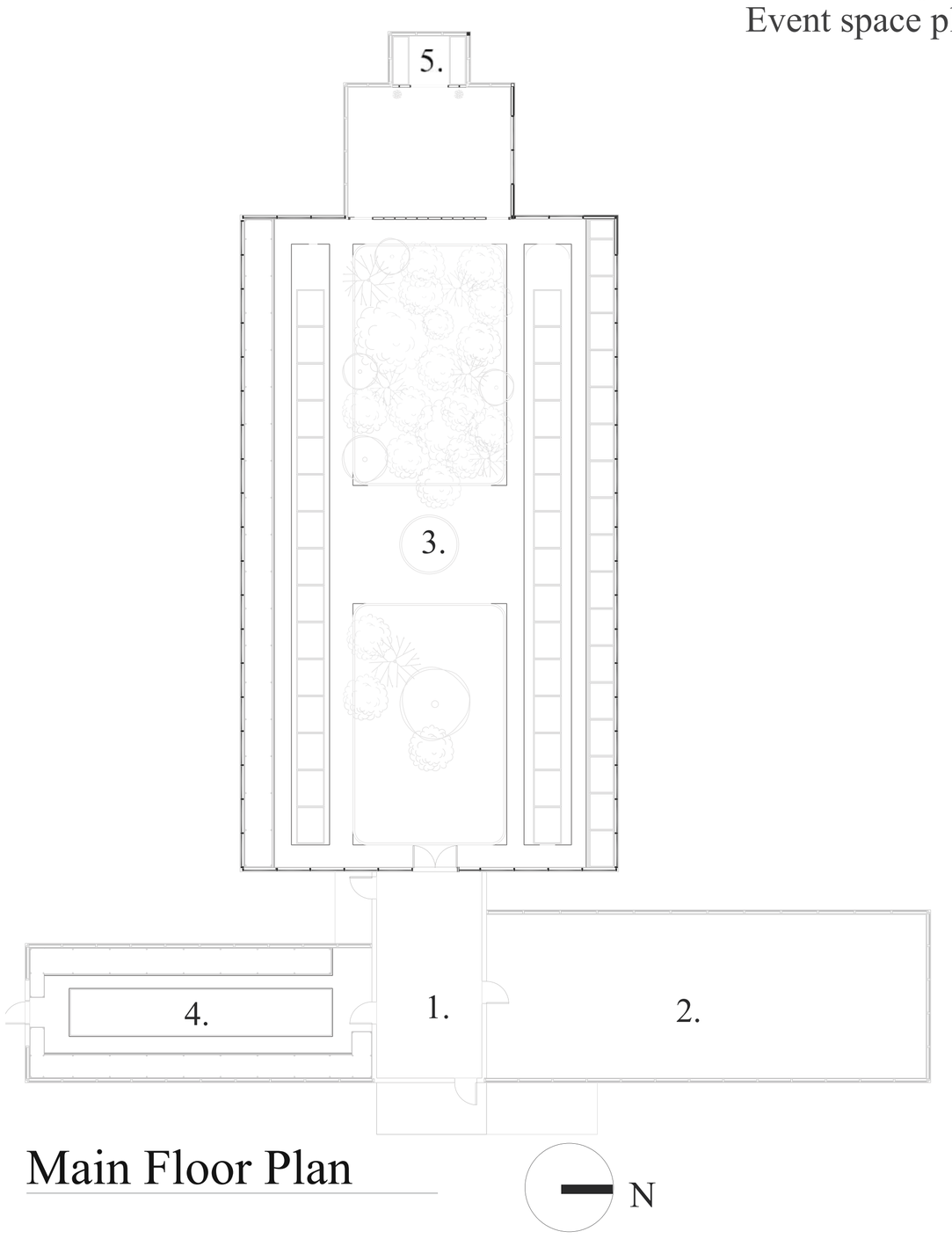
Interior
- Introduce community garden plots
- General cleaning of all spaces.

Interior
Main entry space design

Exterior
Insulate along greenhouse foundations

Interior
Reconfigure workspace for growing workshops

Interior
Event space planning



Main Floor Plan

N

Program Diagram

1. Main Entry
2. Workroom
3. Botanical Garden
4. South Greenhouse
5. Rear Entry

Virginia Commons

....where people, plants, and produce converge

Scenario 3

Social Sustainability

Economic Sustainability

Environmental Sustainability

Energy
Install night insulation system

Landscape
Master planning to include park

Energy
Install Photovoltaic system to offset electricity use

Exterior
- Finish installation of remaining double-walled glazing.
- Seal all drafts and cracks in the greenhouse glazing structures.

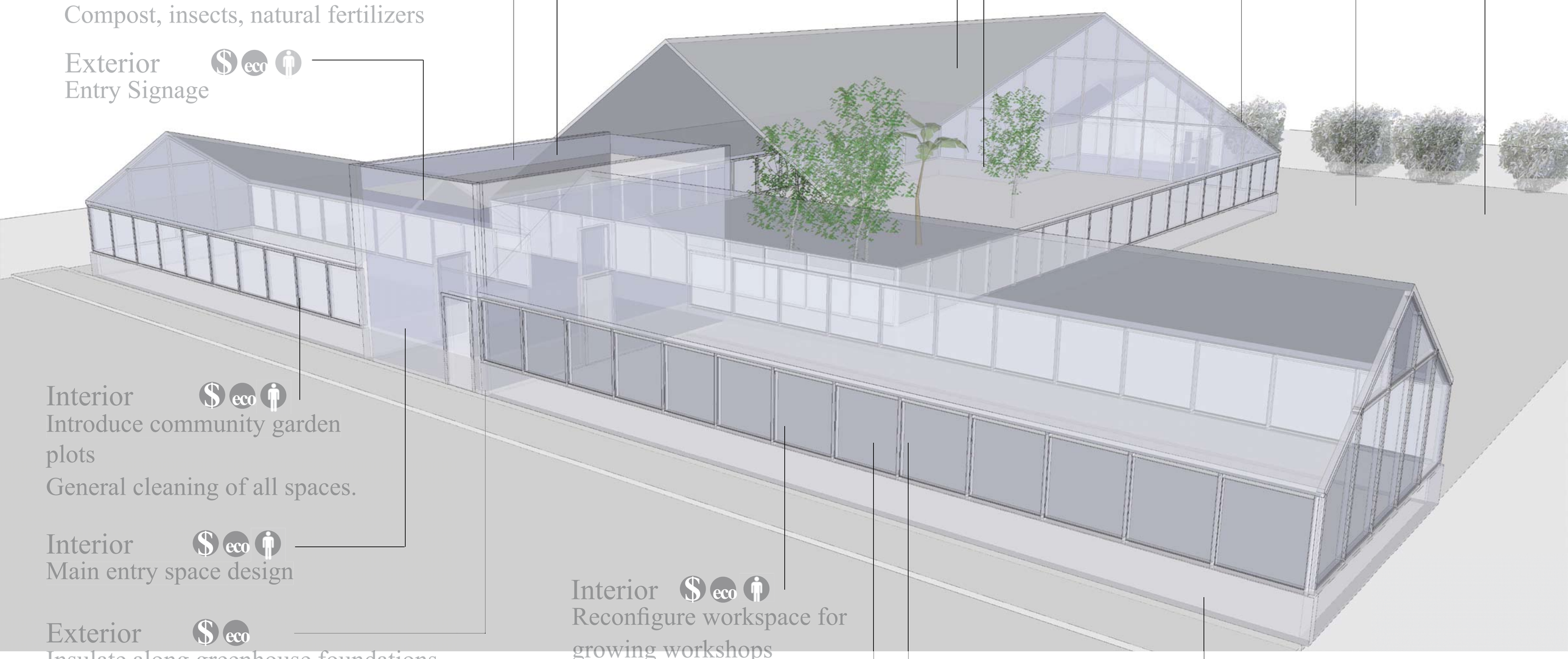
Landscape
Use planting beds

Energy
Add 6 solar thermal panels to roof of office

Landscape
Relocate bushes facing the park

Interior
Pest management
Compost, insects, natural fertilizers

Exterior
Entry Signage



Interior
Introduce community garden plots
General cleaning of all spaces.

Interior
Main entry space design

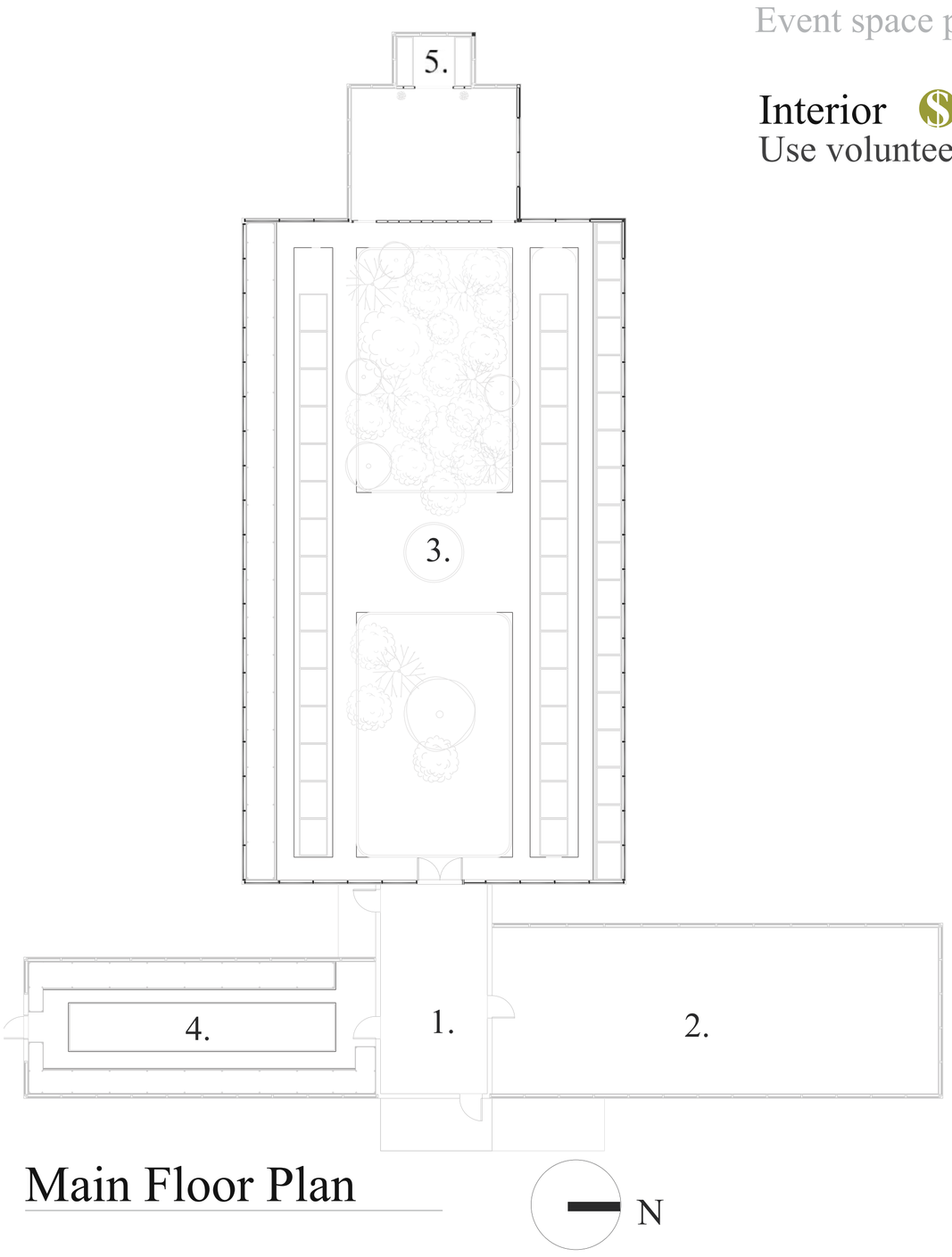
Exterior
Insulate along greenhouse foundations

Interior
Reconfigure workspace for growing workshops

Interior
Event space planning

Interior
Use volunteers

Energy
- Close off steam connection
- Replace Metal Halide lights with LED grow lights



Main Floor Plan

N

Program Diagram

1. Main Entry
2. Workroom
3. Botanical Garden
4. South Greenhouse
5. Rear Entry

Scenario 1 (the "Of course!")
-Finish installation of remaining double-walled glazing.
- Glazing material is already purchased and on-site.
- Requires labor to install, and safety considerations

-Seal all drafts and cracks in the greenhouse glazing structures.
- A very thorough sealing of all glazing
- Requires silicone caulk for non-moveable glazing, and gasketing material for vents and moveable glazing

Represents about 20% decrease in heating energy required.
Would save about $5300.00 annually. (based on 08-09 energy prices)

Scenario 2 (the "Okay, that's a great idea!")
-All of Scenario 1
-Insulate along greenhouse foundations
- Add 2" extruded polystrene on exterior of all concrete above and down to 3' below grade).

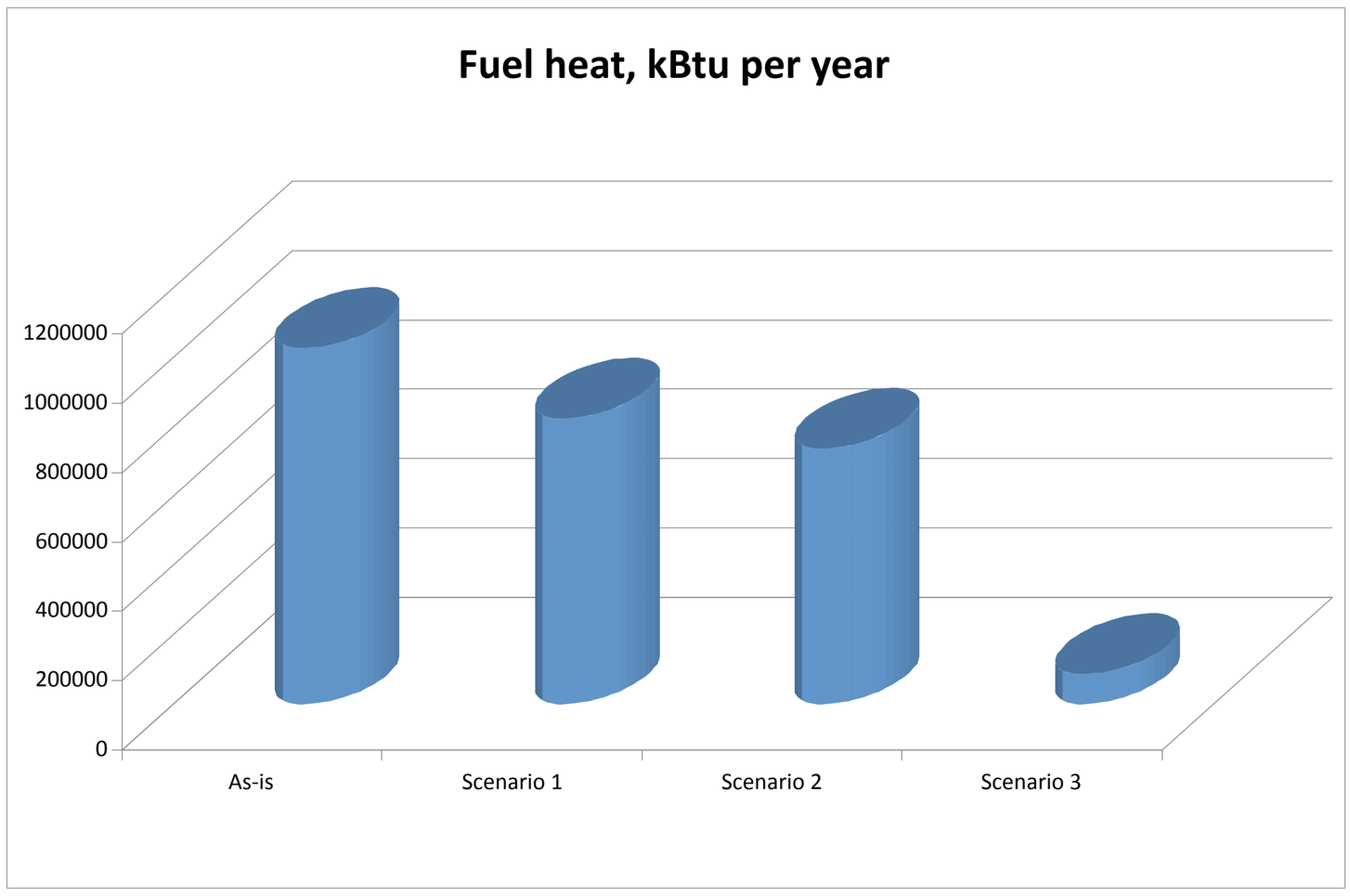
Represents about 28% decrease in heating energy required.
Would save about $7500.00 annually. (based on 08-09 energy prices)

-Add 6 solar thermal panels to roof of office that would heat a 1000gal. tank of water in the basement during the day. Heated water is then used for space or soil heating at night.
- 60 degree incline collects heat during winter months, reflects during summer months.
- Requires infrastructural changes (panel mounting, tank installation, radiator or heat exchanger system, plus plumbing)
- Requires space in basement.
- Installation cost estimated around $6000-$10000
- Actual heat energy reduction to be determined.

Scenario 3 (the, "Well, that's a great idea, but it's a really big investment.")
-All of Scenario 2
-Install night insulation system
- System of retractable or removable R-10 insulation to go on interior of glazing system.
- Infrastructural changes required to mount insulation system.
- Installation cost around $200000-$600000.
- Would potentially save $23000 annually. (based on 08-09 energy costs)
- Estimated 87% decrease in heating energy required.

-Replace MH lights with LED grow lights.
- 80% reduction in lighting electrical energy use.
- MH lights are free (from law enforcement). LED lights are $400-$500 each.
- Savings dependent on use.

-Install PV system to offset electricity use.
- Requires infrastructural change.
- Installation location undetermined.
- Estimated cost around $6000-$10000 per kW installed.



Energy-10 Summary Page — Dec 07, 2009
Project: PROJ4 — Project Directory: C:\Program Files\Energy-10\Version 1.8\Projects\PROJ4

	As-is	Scenario 1	Scenario 2	Scenario 3
Fuel heat, kBtu per year	**1025727**	**823827**	**737206**	**85521**
Percent reduction from as-is		**20%**	**28%**	**92%**
kBtu/ft2	**234**	**188**	**171**	**19.5**

Description:	Reference Case - As is	Scenario 1	Scenario 2-1	Scenario 3-2
Scheme Number:	8 / Saved	5 / Saved	9 / Not Saved	11 / Not Saved
Library Name:	ARCHIVELIB	ARCHIVELIB	ARCHIVELIB	Local Only
Simulation status, Thermal/DL	valid/NA	valid/NA	valid/NA	valid/NA
Weather file:	INT_FLLS.ET1	INT_FLLS.ET1	INT_FLLS.ET1	INT_FLLS.ET1
Floor Area, ft²	4382	4382	4382	4382
Surface Area, ft²	12920	12920	12920	12920
Volume, ft³	63204	63204	63204	63204
Total Conduction UA, Btu/h-F	6060.8	5293.7	4946.5	1056.3
Average U-value, Btu/hr-ft²-F	0.469	0.41	0.383	0.082
Wall Construction	greenhouse, R=10.8,etc	greenhouse, R=10.8,etc	greenhouse, R=10.8,etc	greenhouse, R=10.8,etc
Roof Construction	greenhouse roof, R=13.4	greenhouse roof, R=13.4	greenhouse roof, R=13.4	greenhouse roof, R=13.4
Floor type, insulation	Slab on Grade, Reff=11.8	Slab on Grade, Reff=11.8	Slab on Grade, Reff=11.8	Slab on Grade, Reff=20.1
Window Construction	dbl-walled polycarbonate, U=0.59,etc	dbl-walled polycarbonate, U=0.59,etc	bl-walled polycarbonate, U=0.59,etc	night insulation, U=0.10,etc
Window Shading	None	None	None	None
Wall total gross area, ft²	3102	3102	3102	3102
Roof total gross area, ft²	5436	5436	5436	5436
Ground total gross area, ft²	4382	4382	4382	4382
Window total gross area, ft²	7563	7563	7563	7563
Windows (N/E/S/W:Roof)	23/33/23/33:248	23/33/23/33:248	23/33/23/33:248	23/33/23/33:248
Glazing name	dbl wall polycarb, U=0.60	dbl wall polycarb, U=0.60	dbl wall polycarb, U=0.60	night insulation, U=0.10
Operating parameters for zone 1				
HVAC system	Heat and Vent with Gas Furn	Heat and Vent with Gas Furn	Heat and Vent with Gas Furn	Heat and Vent with Gas Furn
Rated Output (Heat/SCool/TCool),kBtu/h	400/99/131	400/99/131	400/99/131	400/99/131
Rated Air Flow/MOOA,cfm	4000/1	4000/1	4000/1	4000/1
Heating thermostat	62.0 °F, no setback	62.0 °F, no setback	62.0 °F, no setback	62.0 °F, no setback
Cooling thermostat	100.0 °F, no setup	100.0 °F, no setup	100.0 °F, no setup	100.0 °F, no setup
Heat/cool performance	eff=80,EER=1.0	eff=80,EER=1.0	eff=80,EER=1.0	eff=80,EER=1.0
Economizer?/type	no/NA	no/NA	no/NA	no/NA
Duct leaks/conduction losses, total %	11/10	11/10	11/10	11/10
Peak Gains; IL,EL,HW,OT; W/ft²	0.00/0.00/0.00/0.00	0.00/0.00/0.00/0.00	0.00/0.00/0.00/0.00	0.00/0.00/0.00/0.00
Added mass?	none	none	none	none
Daylighting?	no	no	no	no
Infiltration, in²	ELA=350.0	ELA=100.0	ELA=100.0	ELA=100.0
Results:				
Energy cost	.190$/Therm,0.054$/kWh,2.470$/kW	1.190$/Therm,0.054$/kWh,2.470$/kW	190$/Therm,0.054$/kWh,2.470$/kW	190$/Therm,0.054$/kWh,2.470$/kW
Simulation dates	01-Jan to 31-Dec	01-Jan to 31-Dec	01-Jan to 31-Dec	01-Jan to 31-Dec
Energy use, kBtu	1072589	870688	793849	132383
Energy cost, $	12994	10591	9677	1806
Saved by daylighting, kWh	-	NA	-	NA
Total Electric (**), kWh	13733	13733	13733	13733
(** less Sellback, if any)				
Internal/External lights, kWh	0/0	0/0	0/0	0/0
Heating/Cooling/Fan, kWh	0/0/13733	0/0/13733	0/0/13733	0/0/13733
Hot water/Other, kWh	0/0	0/0	0/0	0/0
Peak Electric, kW	1.6	1.6	1.6	1.6
Fuel, hw/heat/total, kBtu	0/1025727/1025727	0/823827/823827	0/746988/746988	0/85521/85521
Emissions, CO2/SO2/NOx, lbs	139596/221/190	115751/199/163	106676/191/153	28557/118/67
Construction Costs	698695	698695	698695	698695
Life-Cycle Cost	1091486	1024168	998525	777935