THE INTENT

In the spring of 2005, the Studio in Landscape & Urban Ecology addressed the Southwest Community of the City of Syracuse by preparing design concepts and strategies that demonstrate the ability of the measurably sustainable urban forest to play a catalytic role in reclaiming, re-valuing, re-defining and redesigning the essence of community and place in urban neighborhoods currently characterized by poverty, abandonment, disinvestment, vacancy and problems with public health and safety.

Specifically, the project addressed the following questions:

1. What is a measurably sustainable urban forest at neighborhood scale?
2. Can a sustainable urban forest that measurably contributes to a high standard of air, water and soil quality be a dominant community design element that organizes the environmental, economic, social and aesthetic experience of the urban neighborhood?
3. What are the spatial implications of the measurably sustainable urban forest as the organizer of community-scale functional and physical relationships?
4. Can the measurably sustainable urban forest (with its implications regarding types, locations and densities of vegetation and, therefore, of streets, open spaces and buildings) contribute to the development of a new concept of what the “good” urban neighborhood is?
5. Can the measurably sustainable urban forest allow what are now currently distressed neighborhoods to contribute to a local and regional sense of environmental well-being and simultaneously improve the physical and mental health of local citizens?
6. Can the measurably sustainable urban forest play a role in social and economic development and in eventual social and economic sustainability in what are currently distressed neighborhoods?
7. Can the measurably sustainable urban forest contribute to the aesthetic signature of a distressed/recovering neighborhood?
What are the design vocabularies of the urban forest? What are the functional roles of forests, woodlands, parks, gardens, plazas, street trees, etc?

In Syracuse, New York, can the urban forest be considered municipal infrastructure and, like roads, water / sewer and architecture, become an important (even dominant) aspect of the city planning and development process?

THE STUDIO APPROACH

The service-learning studio consisting of four second-year graduate students in landscape architecture, one graduate student in environmental & community land planning and seven fifth-year undergraduates in landscape architecture, addressed the target neighborhood through the following process:

1. Background research on urban forestry as urban design.
2. Analysis of the study area in terms of the structure, performance and interrelationships of natural and cultural features and systems.
3. The determination of issues, opportunities and constraints regarding the potential for urban forestry as urban design.
4. The establishment of community design goals, objectives and programming that meet the needs of local citizens and local government and maximize the potential of urban forestry as urban design.
5. The development of neighborhood design concepts that are environmentally, economically, socially and aesthetically sound and sustainable and that address the neighborhood in terms of percentage of vacant land and percentage of occupied parcels given to plant materials within the context of other land uses. Each team will develop urban design schemes that consider general community revitalization within the framework of:
   - 25% plant coverage of currently vacant land – 25% coverage of occupied parcels
   - 50% plant coverage of currently vacant land – 50% coverage of occupied parcels
   - 75% plant coverage of currently vacant land – 50% coverage of occupied parcels
6. The generation of heavily-illustrated (with annotations and text) urban design recommendations in the context of collaboration with project partners.

Students worked in small teams but took individual responsibility for aspects of the planning and design recommendations.

This project will help the City of Syracuse and Jubilee Homes, Inc. to understand the value of the urban forest in climate amelioration, reduction of greenhouse gasses, the cleansing of air, water and soil, the production of wildlife habitat, economic development through the improvement of neighborhood property values, the improvement of neighborhood social interaction, aesthetic enhancement leading to a positive local sense of place and in helping the City to continue to meet clean air and clean water standards set by New York State and the Federal Government. In addition this project is intended to offer a replicable model of how to analyze the roles and impacts of urban forestry as urban design. This studio work can also serve as the basis for a demonstration project by the City of Syracuse and Jubilee Homes, Inc. and also assist the City in securing financial resources to pursue the sound revitalization of its neighborhoods. It is also expected that the project will raise new questions for further research and applied explorations.

COURSE READINGS

GREEN URBANISM, Timothy Beatley
CITIES AND NATURAL PROCESS, Michael Hough
SUSTAINABLE URBAN LANDSCAPES, Patrick Condon
CLASS SCHEDULE

Jan. 19  Course Introduction
Jan. 21  Lecture/Discussion: The Nature of the Urban Forest – The Syracuse Urban Forest (Nowak / Richards)

Jan. 24  Readings/Discussion: Beatley
        Area Analysis
Jan. 26  Area Analysis
Jan. 28  Lecture/Discussion: The Syracuse Urban Forest Master Plan (Liberti / O'Connor)

Jan. 31  Lecture/Discussion: UFORE – The Chicago and Baltimore Studies – Implications for Urban Design (Nowak)
        Readings/Discussion: Beatley
        Area Analysis
Feb.02  Area Analysis
Feb.04  Area Analysis – interim pin up

Feb.07  Lecture/Discussion: The Montreal Process – Implications for Urban Design (Nowak)
        Readings/Discussion: Beatley
        Area Analysis
Feb.09  Area Analysis
Feb.11  Area Analysis

Feb.14  Lecture/Discussion: The Urban Forest & Negative and Positive Externalities (Nowak)
        Readings/Discussion: Beatley
        Area Analysis
Feb.16  Area Analysis
Feb.18  Area Analysis – presentation

Feb.21  Lecture/Discussion: Urban Reforestation – Parks, City Streets, Residential Properties in terms of Species, Methods, Challenges, Examples (Leopold)
        Readings/Discussion: Hough
        Concept Development
Feb.23  Concept Development
Feb.25  Concept Development – interim pin up

Feb.28  Lecture: Onondaga Botanical Garden & Arboretum Project – Urban Parks, Environmental Sustainability and Design Strategies (Carter)
        Readings/Discussion: Hough
        Concept Development
Mar.02  Concept Development
Mar.04  Concept Development

Mar.07  Lecture/Discussion: Anillo Verde in Vitoria-Gasteiz, Spain (Carter)
        Readings/Discussion: Hough
        Concept Development / Preliminary Design
Mar.09  Concept Development / Preliminary Design
Mar.11  Concept Development / Preliminary Design

Mar.14-16-18  SPRING BREAK

Mar.21  Readings/Discussion: Hough
        Preliminary Design
Mar.23  Preliminary Design
Mar.25  Preliminary Design – pin up
Mar.28   Readings/Discussion: Hough
        Preliminary Design
Mar.30   Preliminary Design
Apr.01   Preliminary Design
Apr.04   Readings/Discussion: Condon
        Preliminary Design
Apr.06   Preliminary Design
Apr.08   Preliminary Design – presentation
Apr.11   Orientation for Philadelphia Field Trip
Apr.13   Philadelphia Field Trip – Leave Syracuse at 5:00pm
Apr.14   Philadelphia Field Trip – Fairmount Park Commission
Apr.15   Philadelphia Field Trip – Pennsylvania Horticultural Society
Apr.16   Philadelphia Field Trip – Morris Arboretum
        Return to Syracuse
Apr.18   Readings/Discussion: Condon
        Final Design
Apr.20   Final Design for
Apr.22   Final Design for
Apr.25   Readings/Discussion: Condon
        Final Design
Apr.27   Final Design
Apr.29   Final Design
May 02   Final Presentation (to people from: City of Syracuse local government, SUNY-ESF, Cornell Cooperative Extension, NYSDEC, community leaders/citizens, etc.)

**PROJECT TEAMS**

**North of Bellevue Ave.**

YASMIN GUEVARA
JESSICA KILBORN
JOSEPH KRAL
MICHAEL RICCARDI
SUSAN WYNDHAM
BENJAMIN VILONEN

**South of Bellevue Ave.**

LLLOYD PURDY
JEFFREY ROMANO
SUSAN RUFF
ZAKERY STEELE
MATTHEW SUSH

**PROJECT BOUNDARIES**

**NORTH:**  Gifford Street (from Geddes Street to Onondaga Creek)

**EAST:**  Onondaga Creek & Midland Avenue (from Gifford Street to Colvin Street)

**SOUTH:**  Colvin Street (from Midland Avenue to Geddes Street)

**WEST:**  Geddes Street (from Colvin Street to Gifford Street)
Southwest Community Urban Forestry
LSA 670 Studio in Landscape and Urban Ecology
Spring 2005  Professor Emanuel Carter

<table>
<thead>
<tr>
<th>Team North</th>
<th>Team South</th>
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<tbody>
<tr>
<td>Yasmin Guevara</td>
<td>Laura Hernandez</td>
</tr>
<tr>
<td>Jessica Kilborn</td>
<td>Lloyd Purdy</td>
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<tr>
<td>Joseph Kral</td>
<td>Jeffery Romano</td>
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<td>Michael Riccardi</td>
<td>Susan Ruff</td>
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<tr>
<td>Ben Vilonen</td>
<td>Zakery Steele</td>
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<tr>
<td>Sue Wyndham</td>
<td>Matthew Sush</td>
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</table>
The Northern Study Area includes Geddes Street to the West, Gifford Street to the North, Onondaga Creek and Midland Avenue to the East, and Bellevue Avenue to the South.
Project Intent:

The intent of the Urban Ecology studio of Spring 2005 is to address the Southwest Community of the City of Syracuse by way of design concepts and strategies that demonstrate the ability of the sustainable urban forest to play a catalytic role in the overall improvement of the community. These improvements are intended to reclaim, re-define, re-value and re-design the essence of community and place in urban neighborhoods that are currently characterized by poverty, abandonment, disinvestment, vacancy, and problems with public health and safety.

The following questions will be addressed:

What is the urban forest?

How can the urban forest organize community scale functions and physical relationships?

Can the urban forest contribute to the development of a new concept of what the “good” neighborhood is eventually contributing to the economic and social sustainability of that neighborhood?

Can the urban forest allow what are now distressed neighborhoods to contribute to a local and regional sense of environmental well-being and simultaneously improve the physical and mental health of local citizens?

Urban Forestry:

According to the ministry of forestry of British Columbia, the urban forest is defined as: the cultivation and management of trees and forests for their present and potential contributions to the psychological, physiological, sociological and economic well-being of urban society. Urban forestry includes:

- Forest health
- Stabilizing soil and preventing erosion
- Carbon Sequestration
- Storm water retention
- Wildlife
- Water quality
- Air quality
- Shading solar radiation
- Reducing noise
- Direct and indirect contact and their positive psychological effects (Kaplan and Kaplan)
- Community interaction and development
- Deterring crime, glare and winds

Project Goals and Objectives:

GOAL 1:
To improve the environmental quality in the Southwest Community, contributing to the environmental health of the city in terms of air, water, and soil quality, and by extension increase social interaction, economic development, and aesthetic quality.

Objectives:
- Establish a concept for a system of urban forests in the Southwest Community.
- Coordinate approaches in planting in the private realm with approaches in the public realm.
- Develop community consensus on the degree of desired density regarding the proposed urban forest.
- Provide ongoing community education regarding concepts of tree and garden care and the concept of the urban forest.
- Promote the desirability of the urban forest as an inherent quality of urban neighborhoods.

GOAL 2:
To expand opportunities for social interaction and a stronger sense of community.

Objectives:
- Provide and encourage opportunity for informed community teamwork in the planning, design, installation, and management of urban forest gardens.
- Provide ongoing technical education for the community regarding tree and garden care.

GOAL 3:
To ensure opportunities for economic growth that improves property values and neighborhood desirability.

Objectives:
- Create a concept for a neighborhood aesthetic that increases the desirability of the Southwest Community for those who currently live there or those who would relocate there.
- Encourage the municipality to offer incentives and other support to properties who build in accordance with the concepts of the urban forest.
- Encourage the municipality to use some vacant lots to contribute to the establishment of neighborhood forest gardens.

GOAL 4:
To develop a demonstration project on properties owned by Jubilee Homes Inc.

Objectives:
- Create a partnership among Jubilee Homes Inc., SUNY ESF, and the City of Syracuse to achieve the trial establishment of the urban forest in the Southwest Community.
- Establish the research case study basis for increasing the density and extent of the urban forest.
- Establish the spatial feasibility of implementing an urban forest concept in the Southwest Community.
The northern area is dominated by residential parcels intermixed with abandoned lots and houses.

Three commercial corridors bound and bisect the area with a variety of businesses.

Many of the blocks are anchored with religious institutions which are good opportunities to establish outreach programs that capitalize on existing community relationships.
**Regional Context**

**Hydrology:**

The Onondaga Lake Watershed supports Onondaga Lake and Onondaga Creek, which run through Syracuse and along the eastern border of the Southwest Community.

The greater Syracuse area is situated at the southern tip of Onondaga Lake, within the Onondaga Watershed.

**Prevailing Winds:**
- northeastern

**Snowfall:**
- proximity to Lake Ontario causes significant lake effect snow
- coastal storms (Nor'easters) contribute snowfall in Central New York
- fast moving storm systems (Alberta Clippers) from Alberta Province, Canada, cross the Great Lakes and contribute only a few inches of snowfall in Central New York

**Soil:**
Southwest Community Soil Type: Urban

**Definition:**
A soil material that has a non-agricultural, man-made surface layer more than 50cm thick, that has been produced by mining, filling, or by contamination of land surface in urban or suburban areas (Aubuchon, 1978).

**Characterized by:**
- modified soil structure leading to compaction
- presence of hydrophobic (non-wettable) surface crust
- interrupted nutrient cycling and nutrient availability
- presence of contaminants (e.g., glass, wood, metal, asphalt, masonry, plastic, asphaltic, lead)
- restricted aeration and water drainage
- altered soil temperatures

**Sunshine:**
- minimal in winter due to lake effect snow and clouds, as well as proximity to numerous storm tracks.
- low angle sun from November to February (only 23 to 37 degrees above the horizon).

**Local Context**

**Precipitation and Snowfall:**

The City of Syracuse, and therefore the Southwest Community, receives significant lake effect snow during the winter and consistent, well-distributed rainfall during the spring and summer months.

- average annual rainfall: 30 inches
- July receiving the highest precipitation
- average annual snowfall: 119 inches

**Prevailing Winds:**
- northeastern
- as temperatures drop, wind velocity and precipitation increase placing Syracuse within Zone 4F - 5G (30-60 degrees F)

**Urban Wildlife and Habitat:**
The local fauna is representative of the wildlife found in Central New York.

Fourteen different types of mammals have been identified within the City of Syracuse, and over 200 species of birds have been recorded in the metropolitan area (U.S. Census Bureau).

Current habitat is found primarily in local parks, woodland areas, existing tree stands, within private property and in existing city infrastructure.

**Environmental Factors**

- Soil Composition
- Hydrophobic
- Contaminates
- Restricted Location

**Air Quality:**

- Receives a rating of ‘GOOD’
- Typical for most American Cities
- Indicates room for improvement since currently no U.S. cities are rated ‘bad’.

**Temperature and Precipitation Average for Syracuse, NY**

- Average annual rainfall: 30 inches
- Average annual snowfall: 119 inches
Approximately 50% of surfaces are considered impermeable.

Impermeable spaces are generally not plantable, in some cases vegetation can be introduced into impermeable spaces as planted medians or islands in parking lots and green roofs.

Impermeable spaces are also factors in heat island effect. Roofs, parking lots and roads all radiate a great deal of heat in the summer, reducing the amount of impermeable surface will also decrease the heat island effect.
Residential typologies are diverse in terms of size and space. The northern parcel contains properties with varying spatial opportunities for vegetation due to a mix of large and small front, side, and back yards, garages, driveways, single and double story houses, utility lines, fire hydrants, and fences. Because of this no single typology can be determined.

As varying architecture and corresponding pavement patterns are diverse the single most common feature of commercial and institutional space are parking lots which propose challenges for planting opportunities. Currently minimal space exists for vegetation in the form of planting strips within parking lots or along the facade of architectural forms.

Single open lots are the most common vacant properties in the northern parcel. Adjacent vacant lots next to each other are uncommon but can be found. A number of vacant corner lots are not uncommon and typically provide more space than a single open lot.

A number of open spaces exist in the forms of park space, backyard space, and multiple open lots from parcelled properties, though uncommon in the northern parcel. Expanses of urban forest in the form of tree to tree relationships and understore are possible within such parcels. This can provide unique spaces for heavier and more dense forest.
Tree Frequency

Dots represent approximate tree canopy

Existing vegetation conditions.

Power lines are unavoidable. Precedent for appropriate tree species exist, and should be thought of as models. Ultimately moving power lines from the overhead to underground would create the most opportunities for tree planting. Photos from Rich Street.

Volunteer plants have taken advantage of old fence lines and general non-action on the part of home owners. Despite being generally less desirable species, Acer rubrum, Allamanda, acacia, they are opportunities because they are mature and can be used to encourage understory species.

Vacant lots are great opportunities to develop urban woodlands or community parks. It is important that lots become something to stop the encroachment that hurts the Planet Community. Photos taken at Onondaga and Puthman.

Many back lots in the area have little wood lots. These areas are already well on their way to being urban forests. The best opportunity here is to show how to manage a woodlot in the correct manner to create a healthy ecosystem. Photo from Clover St.

Most common species are the Maples making up about 40% of overall tree species followed by Honey Locust, then Ash, then Crabapples. After crabapples no other species has more than 3% distribution over the site.

Ihe trees that are in the best condition tend to be Ashes and Cedars, trees in the worst condition are the Lindens and Norway Maples. This is important to consider when planning to plant in the future, successful species should be encouraged and unsuccessful species not used.

Street Tree Frequency & Vegetation Condition

Southwest Community Urban Forestry
Syracuse, NY
Concept: URBAN FOREST GARDEN

Concept Statement:
To establish an approach to canopy, understory, and ground cover in public space and private parcels that accrue to be a neighborhood urban forest garden that can be understood in terms of varying densities of plant coverage.

Program:
Explore the aesthetic and environmental potentials of the forest garden concept by establishing a range of plant palettes that offer distinctive forms, patterns, colors, textures, and habitats in all four seasons; work together in viable communities, and contribute significantly to the improved quality of air, soil, and water and provide community wide plant signatures for the Southwest community.

-Explore the spatial and social feasibility of the urban forest garden in the Southwest community, illustrating potential intensities in terms of twenty-five, fifty, and seventy-five percent canopy and garden coverage in both private and public realms, including implications regarding relative costs and benefits.
Gardens that Work

Bio Swales and Rain Gardens are two examples of water quality improvement methods that can be implemented in the project site.

Bio swales are trenches planted with wet tolerant plant species and a special soil medium that allows infiltration of water after a short period of ponding. The intention is to get rainwater into the ground water level and minimize the amount of water that is carried away in pipes. This would need to be constructed at the municipal level for all of the sub-surface requirements, then managed by the individual homeowners whose property is adjacent. Bio swales are good means of collecting and managing storm water in parking lots, where infiltration is essentially non-existent.

Rain gardens are based on the same concept as a bioswale, but at a smaller scale, most likely the lot level. Here residents can dig a hole and replace the soil with gravel and medium to facilitate water infiltration. These can be a pipe at the bottom but it is not necessary.

Rain gardens and bio swales can be planted with ornamentals or native species as per the desires of the resident.
25% Canopy Cover

25% Canopy coverage represents a minor increase in the existing tree cover. Trees are planted as solitary specimens without much root or canopy interaction. Therefore, this scheme is least like a natural forest, it does however provide the maximum amount of sun for the ground plane and is likely the most conceivable as far as a plan that can be implemented in the near future.

Carbon Sequestration: Carbon Storage performed by 25% Canopy Cover for Residential, Commercial, Institutional, and Street Space of the Northern Parcel - 6,690 tons

Annual Gross Uptake - 200 tons
Annual Net Uptake - 133 tons
Carbon Sequestration: Carbon Storage performed by 50% Canopy Cover for Residential, Commercial, Institutional, and Street Space of the Northern Parcel - 13,300 tons

Annual Gross Uptake - 399 tons
Annual Net Uptake - 268 tons

50% canopy coverage represents almost a 3-fold increase in the existing canopy coverage. Trees are beginning to form clumps or groves with root and canopy interaction. This is beneficial to animal species and the health of the trees. This scheme with plantings primarily in back of lots creates an understory habitat and tree-to-tree relationships that promote ecological sustainability. Placement of trees becomes important to minimize dense shade in unwanted areas.
Existing single-story house with a driveway, no garage, large backyard, small front yard, and adjacent to an open lot.
Proposed tree canopy in each scheme covers 50% of the lot.

Scheme 1
Proposed Canopy Cover with No Gardens
Scheme 1 illustrates deciduous tree plantings which will provide shade and screening during the summer and allow for maximum sunlight during winter.

Scheme 2
Proposed Canopy Cover with Garden
Scheme 2 illustrates an option for additional plantings located around the foundation of the house. This scheme provides sunlight during the winter and shade during the summer.

Scheme 3
Proposed Canopy Cover with flatsrate Gardens
Scheme 3 illustrates the lot planted with both sun and shade gardens while preserving some open lawn for recreation.
Existing two story house with attached garage, large backyard, average front yard, driveway and minimal side yard.

Proposed tree canopy in each scheme covers 50% of the lot.

Scheme 1 proposes deciduous canopy with lawn only. This offers home owners the benefit of shade and sun in their yards and no requires no gardening talent.

Scheme 2 illustrates how scheme one can be enhanced with evergreen foundation plants and shade gardens while retaining significant lawn area. This requires some gardening skill.

Scheme 3 illustrates how the same property can be turned into mostly garden while retaining some lawn. The lawn becomes a feature of the gardens as opposed to being the most dominant element. This requires a fair amount of gardening knowledge.

Southwest Community Urban Forestry
Syracuse, NY

Residential Typology 50% Canopy Cover

Professor Emanuel Carter
Spring 2020
LA-70508: Study in Landscape & Urban Design

Team Members:
Yachin Camara
Jenica White
Jeff White
Kathleen McDonald
Ben Bloom
Eric Weidman
Existing two-story house with minimal plantable space - small front and back yards and long driveway. Proposed tree canopy in each scheme covers 50% of the lot.

Scheme 1 proposes canopy cover which does not meet 50% of the entire lot due to maintaining impermeable surfaces. Permeable surfaces are maximized with tree cover.

Scheme 2 proposes a similar planting plan as scheme 1 with the addition of an alle of trees along the western side of the house. This reaches the goal of 50% canopy cover by replacing part of the existing driveway, and blocks views to neighboring houses in order to provide privacy.

The beginning of the driveway can be maintained to still provide off-street parking for one vehicle. A small garden can accentuate the path from the front to the back of the property. Parking in the bark can be replaced by a courtyard.

Scheme 3 radicalizes the concept of an urban garden as a plant signature in natural wild grasses, wildflowers, rocks, shade plants, and debris typically found in non-urban forest understory. This aesthetic does not have to be truly successional and can be managed in order to provide residence with opportunities for plant preferences.

The alle of trees along the western property line blocks views to the neighboring property and provides privacy. The alle stops short as it approaches the rear. Sun and shade exposure is possible to maximize a shade garden in the rear of the property and the image of a forest clearing in both the front and rear of the property.
Existing single story house with attached garage, large backyard, average front yard, and driveway. Proposed tree canopy in each scheme covers 50% of the lot.

Scheme 1 proposes 50% canopy cover with lawn. This option is for homeowners that prefer open space for recreation, the aesthetic appeal of lawn, and exposure to full sun inside the house.

Variation of tree species and type can provide opportunities for creating or maintaining shade, wildlife, etc., while the canopy cover can still have positive effects for carbon sequestration, reduction of energy costs, etc.

Placement of the large 50 foot tree from the backyard to the front yard may be an option for residence who prefer shade their house.

Scheme 2 proposes the same tree placement as scheme 1, but shows the option for a small shade garden for understory in the backyard while sun exposure provides opportunities for a garden along the western side of the house.

Scheme 3 proposes to remove the attached garage and driveway to maximize garden space.

Mixed gardens provide spaces for food, leisure, and successional areas creating tree to tree relationships of mixed age and species among adjacent properties.

The potential for various plant species, signatures, and garden styles is broad and can accommodate the diverse interests of homeowners and the community at large.

Understory to this degree not only provides aesthetic appeal but also maximizes the ecological functions of a forested landscape.
Proposed Canopy with No Garden.

Proposed Canopy Cover with Garden.

Proposed Canopy Cover with Elaborate Garden.

- Planting trees and gardens in the parking lot will result in a loss of space for vehicles but has a dramatic impact on heat island effect, thus reduces the temperature of cars parked in the lots as well as the parking lots themselves. Tree pits can also serve as sites for water infiltration (Bioswales).

Three levels of gardens for an institution.
Carbon Sequestration: Carbon Storage performed by 75% Canopy Cover for Residential, Commercial, Institutional, and Street Space of the Northern Parcel - 19,500 tons

Annual Gross Uptake: 599 tons
Annual Net Uptake: 399 tons

75% canopy coverage utilizes the majority of permeable space. Wildlife habitat for small mammals and songbirds is maximized. Tree placement is spatially constrained yet critical for maximizing sun exposure. Gardens will have to consist primarily of shade-tolerant plants, especially in instances where shade is too dense to support lawns. In this case, shade-tolerant groundcovers could be substituted for grass.
PROJECT SUMMARY:

This project is:

- a step forward to create a new set of moral and aesthetic values for a former industrial city. It would make visible the processes that sustain life. Making the processes visible is an essential component of environmental awareness and a necessary basis for environmental action.

- an opportunity to reverse the idea that any human intervention is harmful for the environment. In other words, human needs can be in close ecological restoration and rehabilitation.

- an alternative design strategy to the aesthetic conventional designs; those are more concerned with "pedigreed" landscapes than with the forms that evolve from the necessity of conservation. This project is an example of economic and social benefits being made available from minimum resources and energy.

This project contributes to:

- the erasure of the lack of visual connection between the city and the countryside, a very prominent aspect of the American city.

- the celebration of the city's diversity. Diversity implies health because it allows the mixture of communities of different ecologies together.

- the improvement of the quality of life. The quality of life implies, among other things, being able to choose between one place and another, between one lifestyle and another. It implies interest, purpose, sustainability, sense and varied landscapes.

- the planting and creation of green corridors among the residential blocks that would work as co-parking projects. They would plant new neighborhood traditions.

- the improvement of air quality and storm water retention.

- the recovery of vacant lots for community use.

This project supports:

- the city of Syracuse's commitment "by Common Council Resolution" to CITIES FOR CLIMATE PROTECTION, which is the American approach to addressing the Kyoto Accords of 1997.

- the magnitude of the commitment is shown by the different capacities for work done at the following levels of canopy coverage:
  - existing 17% Carbon Storage = 4533 tons
  - 23% Carbon Storage = 6,230 tons
  - 49% Carbon Storage = 14,510 tons
  - 75% Carbon Storage = 10,950 tons

Hence, more canopy coverage = more work done to create and support a healthy environment!

CONCLUSION:

- Successful integration of forest garden communities into the urban fabric requires commitment and participation from members of private, public and institutional sectors of the community.

- Each sector needs to utilize the following in order to establish urban forest gardens:
  - Policy
  - Curriculum, technical and educational education
  - Community involvement and participatory programs
  - Resources: land, money, talent, energy, will

- Dissemination of information and continued research and modeling with regard to the costs and benefits of establishing urban forest gardens into the permanent city record needs to be on-going, especially relative to measurable changes in the following areas:
  - Energy Costs
    - Water Retention
    - Air Quality
    - Aesthetic effects
    - Improved Public Health

Ultimately, a shift in public attitudes and values towards ecological design and the urban forest's role in creating, implementing and maintaining ecological sustainability within the urban fabric is perhaps the greatest challenge currently facing cities.
Team South
The Southern Study Area includes Geddes Street to the west, Bellvue to the North, Midland Avenue to the East, and Colvin to the South.
Goal:
Objectives:

Create an ecologically sound community through the use of:
- Stormwater management and erosion control
- Increase habitat and species diversity, both plants and animals
- Maximizing and utilizing available plantable spaces and the capacity of residential lots
- Creating wildlife corridors
- Accounting for urban soils and plant tolerances for salt, snow, and hardness zone

Encourage reclamation of a distressed neighborhood through the use of:
- Comprehensive street improvements
- Community involvement and implied ownership
- Community education and economic improvement
- Community identity, image, and reputation
- Increased public safety, personal safety, and traffic safety
- Neighborhood aesthetics and quality

Redefine concept of a "good neighborhood" through:
- Neighborhood quality and image
- Community education and economic improvement
- Pedestrian experience
- Appreciation of the environment
- Range of visual elements, habitats, and community space

Create a replicable model by:
- Redefining the urban structure with increased vegetation
- Improving neighborhood quality and image

Create a cost effective aesthetically pleasing environmental infrastructure through the use of:
- Stormwater management and erosion control
- Increase habitat and species diversity, both plants and animals
- Maximizing and utilizing available plantable spaces and the capacity of residential lots
- Community involvement and implied ownership

Program:

Explore the aesthetic and environmental potentials of the forest garden concept by establishing a range of plant palettes that offer distinctive forms, patterns, colors, textures and habitats in all four seasons; work together in viable communities, contribute significantly to the improved quality of air, soil and water, and provide community-wide plant signatures for the Southwest Community

Explore the spatial and social feasibility of forest gardens by illustrating potential intensities in terms of 25%, 50%, and 75% canopy and garden coverages in both private and public realm, including implications regarding relative costs and benefits.

Precedents:

Top Right: A large tree and shrubs in a front yard on the corner of Bellevue and Roberts in Syracuse.

Above: A wide variety of plant species in a yard in Canada (www.anvisit.ca/Notilus.1917/).

Bottom Right: Street trees on St. John Street in Syracuse.

Concept Statement

Revitalize a distressed neighborhood by integrating the principals of urban forestry and urban design into a densely vegetated community that contributes to the measurable ecological, social, economic and aesthetic improvement of the city.
Patterns Of Use and Movement

Secondary Places for Public Social Interactions

- Positive street activity of majority is inhibited by illicit behavior by a few
- Local stories offer close proximity to necessities, but major shopping requires a trip out of the neighborhood
- Schools have the most contact with the youth of the neighborhood
- Strong and active faith based community

Land Use Map

Demographics

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<thead>
<tr>
<th>Profile of Selected Labor Characteristics</th>
<th>Southwest Community Urban Forestry</th>
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</thead>
<tbody>
<tr>
<td>Labor Force Characteristics</td>
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<td>Employment Status</td>
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<tr>
<td>Employed Full-time</td>
<td>1,549  100%</td>
</tr>
<tr>
<td>Employed Part-time</td>
<td>311    20%</td>
</tr>
<tr>
<td>Self-Employed</td>
<td>20     1%</td>
</tr>
<tr>
<td>Total Labor Force</td>
<td>1,900  100%</td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>10  0.5%</td>
</tr>
<tr>
<td>Total Unemployment</td>
<td>10  0.5%</td>
</tr>
<tr>
<td>Family Income</td>
<td></td>
</tr>
<tr>
<td>Median Income</td>
<td>$40,000  40%</td>
</tr>
<tr>
<td>Income per Person</td>
<td></td>
</tr>
<tr>
<td>Median Income per Person</td>
<td>$25,000  25%</td>
</tr>
<tr>
<td>Educational Attainment</td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>40%</td>
</tr>
<tr>
<td>Some College</td>
<td>30%</td>
</tr>
<tr>
<td>College</td>
<td>20%</td>
</tr>
<tr>
<td>Advanced Degree</td>
<td>10%</td>
</tr>
<tr>
<td>Total Educational Attainment</td>
<td>100%</td>
</tr>
<tr>
<td>Household Size</td>
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<tr>
<td>Median Household Size</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Southwest Community Urban Forestry

Analysis

Social, Cultural
**Front Yards**

One medium size tree planted in a front yard on a small lot enhances the aesthetic of the property. Even with limited front yard space trees planted in the curb can still add value to adjacent property.

This tree defines the property, reduces heating cost through shading and blocks UV radiation.

Tree canopy covers more than half of the non-structural space in this front yard and frames a view of the hurgaline.

**Street**

Small to medium sized trees planted 40’ on center along a curb or even toward the front of a yard create a positive pattern that brings cohesion to a neighborhood.

When located properly, they do not hinder traffic flow, visibility or on street parking.

The canopy of these trees cover about 1/3 of the streetscape.

**Lot**

Many smaller trees planted en-mass are another method of achieving canopy cover, green infrastructure, and a green aesthetic in an urban environment.

When located appropriately these trees enhances the aesthetic of the property. They define the property, reduces heating cost through shading, block noise, and UV radiation.

The canopy of these trees cover 2/3 of the non-structural space on the property.
The Surface/Canopy Analysis on the left shows a representative sample of surface area typologies and canopy in the study area. The sample area is bounded by Bellows Avenue on the north, Cheney on the south, Coolidge Avenue on the west and Rich street on the east. The intersecting 4-block area are Sterling Avenue (east/west) and Palmer Avenue (north/south).

To identify the existing percentage of various surface/canopy typologies 4 general categories were used: 1) tree canopy, 2) impervious surface area, and 3) pervious surface area. Tree canopy is any area that would be covered by tree foliage during the full leaf season. Impervious surface is any areas that are sealed paved (very high run-off coefficients, in contrast to soil areas that are simply highly compacted or building footprints).

Pervious surface areas include any areas that can be used for planting vegetation. However, many driveways in the study area could be considered semi-pervious, as they are either small patches of concrete/brick or gravel areas that have heavily compacted urban soils from parked cars. These were included in the pervious surface area due to the fact that they can be manipulated compared to static impervious surface areas such as roads, fully paved driveways and building footprints.

Pilot study samples were taken of the four-block area using GIS, on-site surveys and aerial photography. The result of the sample area is shown on the left in the percentage bar chart. Existing tree canopy is approximately 17% for the sample area. Impervious surface area is approximately 48% of the total sample area. This leaves about 38% of the sample area to be classified as plantable area for vegetation.

It should be noted that impervious and pervious surface can both be covered by tree canopy. Correctly placed tree canopy can cover paved and additional plantable surfaces, thereby bringing the total canopy, impervious, and pervious surface area above 100% in the sample.

If the goals of the program are to visualize and identify impacts of increased tree canopy percentages (25%, 50% and 75%) then the initial step is to 25% canopy coverage is comparatively small. To reach the first goal of 25% total canopy coverage, only 8% additional canopy coverage is required.

The sections elevations on the left show existing spatial typologies between various housing groups in the study area. To correctly identify how much area is available for planting more trees, and to delineate size constraints, it is important to take this spatial analysis into the proposed design program.

As we can see, housing is often spaced close together with little room between structures for large shade-tree planting. Front yards are also constrained by the limited setback area. This can be ameliorated by taking advantage of city-initiated parking strip planting that would also cover impervious surfaces on public streets. It is apparent that backyards contain the majority of private planting area for large canopy shade trees.
## Site Issues, Opportunities and Constraints

### Part of stating goals and objectives for the project is to evaluate the opportunities and limitations the site presents in relation to a forestry project.

### Environmental

<table>
<thead>
<tr>
<th>Issues</th>
<th>Opportunities</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Reduction of ozone gases, UV, carbon storing, and pollution</td>
<td>Shade</td>
</tr>
<tr>
<td>Water Quality/Watershed</td>
<td>Stormwater management, erosion control</td>
<td>Impervious surfaces</td>
</tr>
<tr>
<td>Wildlife</td>
<td>Human and wildlife interactions, increase habitat and species diversity</td>
<td>Increased interaction, increased animal population</td>
</tr>
<tr>
<td>Climate</td>
<td>Reduce heat island effect, reduction of UV radiation</td>
<td>Expectations</td>
</tr>
<tr>
<td>Vegetation Growth/Time</td>
<td>Education, economic improvement, neighborhood aesthetics and quality</td>
<td>Competing open space needs</td>
</tr>
<tr>
<td>Convergence of Nature and Built Form</td>
<td>Redefining good neighborhood in perigonal terms</td>
<td>Urban soils, plant tolerances for salt, snow, hardiness zone</td>
</tr>
<tr>
<td>Vegetation requirements: climatic, soil</td>
<td>Vegetation diversity, aesthetic contributions</td>
<td>Installation/maintenance, urban wildlife</td>
</tr>
<tr>
<td>Forest diversity</td>
<td>Range of visual elements, habitats, community spaces</td>
<td></td>
</tr>
</tbody>
</table>

### Social

| Housing Stock                                | Neighbourhood quality, image, economic improvement                          | Public safety, auto parking                                                   |
| Public Needs                                 | Pedestrian experience, education, health, welfare                           | Leaf litter, competing open space needs                                       |
| Jurisdiction                                 | Comprehensive street improvements                                           | Vandalism                                                                      |
| Community Attitudes                          | Plantable spaces, increase land usage                                       | SHPO Restrictions                                                             |
| Maintainance & Installations                | Appreciation of the environment, identity, economic improvement            | Utility interference, vandalism, visibility, safety                           |
| Onondaga Park & Botanical Garden & Creek Walk| Implied ownership, community involvement                                   | Management and Maintenance, Public Safety                                     |
| Growth time                                  | Community activity                                                          | Gantrification, image identity, Vandalism                                     |
| Funding                                      | Community education, neighborhood quality                                   |                                                                               |
| Working Class Neighborhood                   | Community participation, identity, image, reputation improvement            |                                                                               |

### Spatial

| Forest Diversity                             | Plantable locations and placement, capacity of residential lots             | Competing open space, costs, wildlife                                         |
| Convergence of Nature and Built Form         | Maximize plantable space                                                   | Utilities, impervious surface, traffic open space needs                       |
| Powerlines                                   | Creating wildlife corridors                                                | Plant species, public safety                                                  |
| Housing Stock                                | Identity, image and reputation, Redefine urban structure                    | Insurance costs                                                               |
| Vegetation requirements: growth, size, root area| Plantable locations and placement, capacity of residential lots          | Public vs private space, location in yard                                    |
| Cayuga                                       | Shade/shade, Convergence of nature and built form                           | Proximity to housing, shading, leaf litter                                   |
| Jurisdiction and Ownership                   | Plantable locations and placement, define spaces                          | Competing space needs, invasive species, maintenance                          |
| Site Distances                               | Frame Views                                                                  | Public safety, personal safety, traffic safety                               |

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**Urban Forestry**
South West Community
Syracuse, NY

**Analysis Matrix**
Issues, Opportunities & Constraints
SYMBIOSIS: This refers to the mutually supportive interaction between cultural and natural communities in such a way as to support the functional integrity of each in terms of:

Functionality - in ecology this refers to the strength of interaction among components and processes in the ability of the earth's atmosphere to support life. In community planning it refers to the strength of interaction among interconnectedness and the use of energy and proximity to foster economic and cultural support. The strength of these interconnections can be subdivided. Grounded in these principles, a municipal plan can focus recommendations for economic, social, environmental, and aesthetic sustainability on measurable and visible criteria that allow a municipality to truly gauge its progress.

Efficiency - in ecology this refers to the ability of communities to sustain the maximum amount of useful work and the surrounding systems to which they are linked. In community planning this refers to making the maximum reasonable use of existing and proposed infrastructures such as housing, water, and sewer systems, streets, schools, parks, community centers, etc. - getting the most effective use of linear miles, per acre, use buildings, use cold air, use water, vegetation and waste. Functionality is about the efficiency of the most efficient use of urban land for human activities that we might make the most efficient use of urban land.

Diversity - in ecology this refers to the value of species variety as an agent of enriched community interaction in terms of the increased opportunities for system generation and the ability to withstand stress. In community planning this refers to making the most of diversity and proximity to maximize the connection of multiple social, economic, environmental and aesthetic phenomena that are interdependent and mutually supportive. This is about survival. The successful community must have a diverse and multi-faceted core. It must have bright, light, and heavy manufacturing, retail and wholesale commerce, tourism and local entertainment, etc. This allows the community to better weather disruptions in the local, regional, and global economy and to better re-invent itself in the face of adversity such as earthquakes or war. Economic diversity is directly tied to demographic diversity, especially in terms of the multiplicity of skills necessary to keep the economy running. In turn the necessary range of economically valuable skills is tied to local and regional opportunities for quality education and training. In a vibrant economy, demographic diversity might lead to relaxed social interactions between different ethnic and racial groups and encourage all to contribute their histories, their values, their perspectives, and their talents toward making the community better than the sum of its parts. This might be enhanced in the context of suitable natural and architectural aesthetics and the visibility of public health and private safety, which serve to attract those people with talents and choices and to attract those whose choices might be more limited. Diversity plays a strong role in defining an attractive sense of place.

Sustainability Criteria:

- Functionality
- Efficiency
- Diversity
- Resilience
- Equilibrium

Southwest Community Urban Forestry
Sustainability Criteria

Professor Emanuel Carter
Spring 2005

[Signatures]
Urban Forestry
South West Community
Syracuse, NY

50% canopy - no garden
50% canopy - with garden
50% canopy - with lush garden

Jubilee Homes
Canopy & Garden Matrix

50% canopy coverage
No garden
Increased tree maintenance
Some wildlife
Medium ecological work
Low cost for owner
Increased shade
Open space
Mostly clear sight lines

50% canopy coverage
With garden
Medium maintenance
Some wildlife
Medium ecological work
Medium cost for owner
Increased shade
Some open space
Less clear sight lines

50% canopy coverage
With lush garden
High maintenance
Medium wildlife
High ecological work
High cost for owner
Increased shade
Very small open space
Obstructed sight lines
The Urban Garden

This board illustrates different levels of tree canopy and garden cover on a pair of residential lots. The purpose is to show a range of tree canopy from 25%, to 50%, to 75% coverage on each lot.

The illustrations to the left give a potential view from the rear of the house into the backyard garden. While the extent of garden material in each illustration is different, the canopy cover stays constant at 50 percent.

With the addition of under story and ornamental plants the theme shifts from ecological urban forestry to an urban garden aesthetic. This design seeks to meet the three proposed levels of canopy cover, introduce a garden element into the urban forest paradigm and preserve as much of the traditional open-backyard space as possible in each scenario.

These illustrations use a limited plant palette to achieve the goals of the project. Evergreens along the back screen views and provide year-round privacy. A large shade tree along the side shelters the house and side parking strip. Ornamental trees of various shape, size, and character add visual interest. Other benefits are external to the property. Canopy improves air quality, decreases the initial flood of storm water runoff from a site, and often increases property value in a neighborhood.

Increased vegetation does pose some challenges to homeowners. Maintenance could increase depending upon plant types used. The full ecological and visual effect of a planting depends on the time to maturity for a given species. Damage from severe storm events may also be greater on heavily vegetated sites. Other issues include a potential for increased human and wildlife interaction due to an abundance of animal habitat. The limited but real effects of shade from trees in winter must also be considered.

If implemented, a more diverse selection of trees, well suited for the urban environment should be used. A more detailed understanding of any individual homeowners preference for open yard and planted area will also be essential.
Perspective 1
This perspective shows the 60% canopy with gardens. Here, the gardens can be a mixture of sun and shade, resulting in a variety of choices for the homeowner. Shown are traditional bedding along the house and garage and a perennial bed along the back of the lot. The smaller, flowering trees could be fruit bearing or just ornamental, depending upon the homeowner.

Perspective 2
Here with a 40% canopy cover and showing a minimal garden. This case is only a lawn falling short of the required tree. This would be the minimum requirement for all residents in the district. To further personalize the space, adding more vegetation and cover would be beneficial to the yard and greater community.

Perspective 3
Here with a 80% canopy cover a lush garden, showing options of different plant ideas. Here the yard would be attractive to many types of wildlife, depending upon the choices of planting material. Shown are additional flowering trees at the edge of the house and a hedge row at the back of the lot, adding privacy and habitat for wildlife. Perennials abound around the base of the house and around the base of the trees. There are also some annual, smaller planting mixed in the perennial borders.
Institutional Space Scenario

25% Vegetation Increase

An urban forestry model for the City of Syracuse includes lots that are not privately owned or residential. Most communities and neighborhoods also include institutional spaces and commercial/business lots that service the local residents. Part of making an urban forestry project is to address the variety of sites and site-specific elements in which such forest approach can be implemented.

Institutional spaces and commercial lots must service a specific group and so does the site. The following elements were carefully considered and analyzed for the institutional space scenario; notice that some of the elements differ from the residential lots mainly based on scale and use of site:

- Institution Type: use, users, accessibility
- Parking Lot: space limitations, permeability, water run-off, pollution, plowing snow accumulation
- Surrounding context: residential, commercial, uses,
- Boundary lines: vegetation use and needs, sidewalks & accessibility

The existing site lacks canopy cover or any type of forest functional vegetation. It is composed of 75% lawn, which acts as asphalt in terms of water runoff, and the rest is covered by the house structure and the parking lot.

The total area of the lot was considered to increase the vegetation by 25 percent in three similar scenarios:

A-Canopy cover only includes large to medium size trees, canopy and garden it maintains the existing grass lawn as surface cover. It gives maximum leaf surface to absorb air pollutants and process air components.

B-Canopy garden vegetation cover includes trees and shrubs with some perennials providing some space

C-Canopy lush garden scenario is a combined and diverse plant palette of canopy, shrubs, perennials and optional ground covers. It gives gardening options but maintains the site to 25 percent cover.
A - 50% Canopy Vegetation Cover
The proposed site plan for 50% canopy delineates the site boundaries and provides a pedestrian scale along the proposed sidewalk. Large trees can be used inside the lot along the lot limits and away from the structure to avoid structural damage (e.g. branches or trees falling during storm). Also, planting only tree canopy around the proposed parking lot generates more shade decreasing the heat island effect of dense urban spaces.

B - 50% Canopy Garden Vegetation Cover
The main disadvantage to planting only trees is that the grass lawn remains as an almost impermeable surface, limiting the amounts of water that can be absorbed on site. However it provides open spaces for gatherings and activities under the canopy minimizing the loss of space. Including shrubbery and perennials along the house and around the tree canopy provides opportunities to enclose spaces with gardens as shown on the perspective below.

C - 50% Canopy Lush Garden Cover
Transforming institutional lot spaces into lush gardens with some canopy begins to provide habitats for desired wildlife. The design proposed for a lush garden is that it changes the grass lawn into an erosion control and water absorbent ground cover in the already designated garden areas and under some tree canopy. Again the idea of displaying perennials around the structure works best in defining paths, fences and aesthetic views.
**A- 75% Canopy Vegetation Cover**

75 percent of tree canopy can be defined as a wooded backyard. It creates a densely vegetated and shaded environment and changes microclimate. It can also provide more options for uses of varied tree vegetation and a seasonal changing environment. One factor to consider is the spacing between trees both for canopy size (especially as it grows) and root sizing. Heavy large tree roots can become a problem if the site needs to be redeveloped.

The recommended tree sizes and characteristics for all percentages of vegetation cover are as follow:

- **Large Trees**: canopy diameters 50’-65’. Strictly canopy use, limit planting to lot edge, preferably dense foliage, evergreens or deciduous, fruit trees creating a urban park environment. **Two large trees = 25% canopy cover**
- **Medium Trees**: canopy diameter 35’-50’. Ideal size. These can be planted along lot edges or parking lot for shade. They can be dense or less dense foliage evergreens, deciduous and flowering tree species. **Four medium size trees = 25% canopy cover**

**B- 75% Canopy Garden Vegetation Cover**

**Small Trees**: canopy diameter 15’-25’ can be used along sidewalks and in planting beds and gardens or near house structures. A variety of these “pedestrian trees” give excellent aesthetics but low shading, which can be used as an advantage for other ground covers, annuals and perennials to grow. A variety of dogwoods, crabapples, and cherry blossoms create an extraordinary flowering show. Trees that attract wildlife are recommended.

- **Planting scheme B** is an example of a varied vegetation canopies. It includes trees of all sizes and heavily dense ground cover. The advantages of having such diversified plant population in terms of sizes, colors, forms and covered areas are 1. It creates a local microclimate. 2. It provides greater diversified habitats at all canopy levels for more species and 3. It becomes a local garden for the neighborhood through the institution. It can also provide an extensive outdoor learning facility as well a space for themed gardens that involve implementing values and elements of such institutions. Another social value is the beautification of the overall community.

**C- 75% Canopy Lush Garden Cover**

Disadvantages to planting a highly dense lush garden in such a lot can be summarized in the following points:

- High maintenance required to maintain species within lot limits, pruning, intense gardening, watering etc. This is particularly hard for institutions found in the Southwest neighborhood that are religious or educational and operate under a non-profit budget. However an option would be to maintain the garden as a “wild” requiring low maintenance or turning it into a community gardening project.
- Safety problems are usually associated with a highly dense area, especially at eye level. However some of the proposed schemes at 25 and 50 percent suggest small trees and shrubs along the sidewalks and parking lots for the same reason. Also trees and shrubs with loss dense canopy can be used and planting beds or lush vegetation can go behind lots where it is a private access area.

- Wildlife will definitely establish in a lush garden. Although wildlife is an important element to creating an urban forest carefully selecting plant species will define the overall experience for residents in their backyards.
Benefits

Heating and Cooling

Thin, well-planted trees around a home can lower air conditioning bills by up to 30 percent. Mature trees can provide windbreaks that can reduce winter heating bills by up to 30 percent.

Trees are also natural buffers to harsh weather conditions. Heavily forested urban areas are consistently 2 to 4 degrees cooler during the summer and 1 to 3 degrees warmer during the winter than deforested land. Trees can moderate wine spots by up to 20 percent, compared to treated areas. A functioning urban forest canopy will also help to counter the urban heat island effect. (U.S. Department of Energy)

Storm Water

Infiltrating storm water that might otherwise result in flooding or runoff on pollutants into city waterways, such as Ockensaw Creek. A large shade tree can absorb as much as 700 gallons of water in 1 hour, reducing runoff of polluted storm water. The increased urban forest canopy and roof systems can reduce peak storm runoff by 10 to 20 percent. (USDA Forest Service)

Air Pollutants

An increase in urban forest canopy will absorb more carbon dioxide and convert it into oxygen. One acre of trees provides enough oxygen for 18 people, and absorbs as much carbon dioxide as a car produces in 2,000 miles. Increasing the canopy coverage in the Southwest Community area to 20% will absorb over 1 million pounds of atmospheric pollutants. Trees also remove sulfur dioxide and nitrogen oxides, two major components of acid rain and ozone pollution. (U.S. Department of Energy)

Community

Adding trees and gardens within residential yards will not only benefit the overall functionality and efficiency of the urban ecosystem, it will provide increased aesthetic value and contribute to increased property values. The effect of gardening in such a distressed community is noted “reen-germing,” and will expand and residents and neighbors get accustomed to experiencing the presence of nature and trees in their yards.

Trees also increase neighborhood and economic stability by allowing and keeping residents and businesses (shopping) in a community. Mature trees also raise property values by up to 20 percent. (American Forestry Association)

Summary

Through the analysis and inventory process, the city has been questioned as to how much canopy coverage is reasonable in terms of maintenance, cost, and available space. After working through conceptual design of the various canopy porosity, we can begin to understand how much work, cost, and space is required for that variance in porosity.

An initial increase in canopy porosity to 25% is relatively small considering it only required adding approximately 0% (on average) canopy coverage per lot to reach this 25% goal. However, the increase in ecological benefit is relatively small, but an improvement nonetheless.

Increasing canopy coverage to 50% has shown to be meeting the limit of acceptable coverage in terms of property maintenance, cost, and space. The benefits of such an increase are substantial for the homeowner and the community.

Through these studies, it has become quintessential to continue adding 75% canopy coverage to reasonable. The intense amount of shade produced, available planting space, and the amount of maintenance needed all contribute to making the high canopy coverage difficult and costly to achieve. It is also questioned whether 75% canopy coverage would be aesthetically pleasing to a community that has relatively little surrounding homes.

The design studies have also shown that tree canopy increases should go hand in hand with a garden to help revitalize the distressed neighborhoods. Though gardens require much more maintenance than simply establishing a tree canopy, the psychological and aesthetic benefits will do a great deal of work toward the goal of reviving the community.

Lastly, it will be an initial and sustained community education program on tree maintenance and garden practices that will contribute most consistently to re-defining the neighborhoods and introducing sustainable environmental habits to the community.

Urban Forestry
South West Community
Ecology, Community & The Urban Forest