### BIOPHILIC SCHOOL SITES FOR SYRACUSE, NY

Emanuel Carter, Associate Professor Department of Landscape Architecture SUNY College of Environmental Science & Forestry

Justin Kwiatkowski, Landscape Designer / Certified Arborist Environmental Design & Research PC Syracuse, New York

#### FOREST BATHING IN SYRACUSE NEIGHBORHOODS WITH AN EMPHASIS ON IMPROVEMENTS FOR SITES IN THE SYRACUSE CITY SCHOOL DISTRICT

A Project for The Syracuse Urban Forest Master Plan Steering Committee & The Syracuse Public Art Commission

By LSA 700 Design Studio V Department of Landscape Architecture SUNY College of Environmental Science & Forestry

> Fall, 2018 Professor Emanuel Carter

#### **PRIMARY GOALS**

- (1) To explore the extension and enrichment of Syracuse's urban forest, especially with regard to the delivery of ecosystem services and the improvement of public health at Syracuse City School District sites.
- (2) To explore the idea of the urban forest as a venue for public art.
- (3) To explore the urban forest as a work (or works) of public art.
- (4) To explore the idea of urban forest and public art as urban design.

#### **ADDITIONAL GOALS**

To initiate a discussion about unique ways in which the Syracuse City School District might:

- (1) Improve student, faculty and staff performance
- (2) Change the sense of what it means to arrive at each school each day
- (3) Make the City's schools more attractive to those who move to their families to Syracuse
- (4) To improve the ambience of Syracuse's neighborhoods

### THE MEADOWBROOK NEIGHBORHOOD





Nottingham High School

30

2

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3

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# MEADOWBROOK NEIGHBORHOOD MASTERPLAN

### **DEVELOP A SENSE OF PLACE THAT PROVIDES QUALITY OF LIFE** DELIVER ACCESSIBLE, HIGH QUALITY VISUAL DESIGN **ENSURE AN IMPROVED QUALITY OF ENVIRONMENT**

Connectivity Greenspaces should be connected to each other and to people.

Equity The greenspace system should be distributed throughout the city and be readily available to persons of all social and economic backgrounds and abilities located within a <sup>1</sup>/<sub>2</sub> mile walk from home or work.

Sustainability The greenspace system should integrate sustainable planning and design practices, including the conservation of resources for future generations.

Multi-Functionality The greenspace system should provide multiple environmental, recreation and health, community-building, and economic functions and benefits.

Community The greenspace system should promote the City's shared identity and sense of community by providing places to gather and participate in outdoor activities.

**Biodiversity** The greenspace system should maintain the health and diversity of natural communities within the developed fabric of the City, including a healthy and robust tree canopy.

By decreasing the number of breaks in the median and increasing the amount of the creek that is daylighted, Meadowbrook Drive will serve as a walkable connective corridor for the surround residential neighborhood.





Public Art The greenspace system should incorporate history, culture, and public art as a component of urban design

Public Health The greenspace system should promote health by providing attractive routes and destinations for walking and biking.

Design Excellence The greenspace system should integrate innovative design as a core value.



### WALKABILITY

Completion of the sidewalk will allow a pedestrian friendly and walkable path from Nottingham High School to Barry Park. With limited space on the Northern edge of Meadowbrook Drive the new walkway will travel down the median, running alongside the creek.





### SOCIAL BENEFITS

Create memorable and beautiful places; Strengthen communities; Improve physical health; Calm traffic and promote pedestrian and bicyclist safety; Connect people to place and nature

### **ECONOMIC BENEFITS**

Increase property values; Boost commercial activities; Reduce building heating and cooling costs; Increase worker and student productivity; Improve infrastructure longevity and cost.

### **ENVIRONMENTAL BENEFITS**

Improve air quality and absorb pollution; Mitigate climate change; Reduce noise pollution; Provide habitat; Increased storm-water management; Reduce urban air temperatures;





# **ELMCREST AND** HURLBUT W SMITH K-8 SCHOOL



## EDUCATION

The priority objective at school sites is to create greenspace for learning, student well-being, and connection to place. Nature has been shown to student on mood,

# NOTTINGHAM HIGH SCHOOL



# BARRY PARK AND





# EDGEHILL PARK AND ADJACENT LOTS







### VISION - FOREST BATHING

The proposed design is to expand edgehill park to join adjacent parcels and create an area for an uninterrupted forest bathing experience. Adjacent lots to the East include vacant land (green) and public service (blue). The forested area serves as a recreational space as well as a connective park connecting H.W. Smith K-8 school and Elmcrest to Meadowbrook Drive.

### VISION - PUBLIC ART

The proposed trails through the expanded Edgehill Park maintain the current characteristics and textures of brick walkways and stone walls surrounded by lush vegetation. These elements create a pleasant visual experience and in themselves serve as a work of art.

### FOREST SCULPTURE

Hidden among the vegetation are life-sized stone people. Living among the vegetation, the sculptures are allowed to become overgrown and evermore surrounded in vines and mosses and age with the forest and climate. The growth of vegetation on the sculptures is open to the viewers own interpretation but every visitor will be able to experience the transformation of the sculptures over time.



### THE VALLEY NEIGHBORHOOD



#### A FRAGMENTED CORRIDOR OF EDUCATIONAL CENTERS AND **RESIDENCES.**

LINKED BY ONONDAGA CREEK, A NEGLECTED WATERWAY SURROUNDED BY CHAIN LINK FENCE AND DETACHED FROM ITS SURROUNDINGS.

**OPPORTUNITIES FOR INCREASED FOREST COVER, NATURAL** SYSTEMS FOR EDUCATION, AND IMPROVED **RELATIONSHIP BETWEEN SCHOOLS.** 

CONSTRAINED BY PRIVATE PROPERTY, EXISTING SPORTS FIELDS, SAFETY CONCERNS, AND FAILING INFRASTRUCTURE.





# **URBAN FOREST AS PUBLIC ART** EDUCATION 8 COMMECTION

CONNECT THE SCHOOLS. ENHANCE THE FOREST. INTEGRATE ART.

Nan Duyn Elementary School

N





Clary Middle School

F

21

12:50

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#### PROPOSED MASTER PLAN **PUBLIC ART** Integrate public art within the urban forest Create opportunities for public art to seamlessly blend into the environment, the urban forest, and school atmospheres. VAN DUYN **MIDDLE SCHOOL FOREST BATHING** Increase and encourage ownership and responsibility for the forest Improve physical and psychological health of **FOREST WALK** those who come in contact with the urban forest **CANOPY ENHANCEMENT** Create specific and thoughtful nodes for students, faculty, staff, and members of the community can interact with the urban forest Intertwine the school and built environments with the urban forest FAITH HERITAGE **SCHOOL** NEIGHBORHOOD DESIGN QUALITY Extend and enrich Syracuse's Urban Forest

Restore Onondaga Creek

Provide opportunity and space to connect students and members of the community directly with their urban forest on a daily basis

### **ENVIRONMENTAL QUALITY**

RBAN FORES

Public access to Onondaga Creek Connect the schools through a defined network of trails Integrate public art seamlessly into the landscape

42%

75%

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0

EXISTING TREE COVER

TREE COVER

> CLARY MIDDLE SCHOOL



MEACHEM \_\_\_\_\_ ELEMENTARY SCHOOL

REPURPOSED BASEBALL FIELDS

• FOREST COVER -INCREASED FROM 42% TO 75% • REPURPOSED BASEBALL FIELDS TRANSFORMED INTO CONNECTED • NODE SPACE' WITH SENSORY EDGES • ENHANCED EXISTING FORESTED BORDER



0 20 40

PRESERVED

ATHLETIC

SPACE

P

OPEN NODES WITH SENSORY EDGES

> PRESERVED BASEBALL FIELD

> > OPEN NODE WITH SENSORY EDGES

REPURPOSED BASEBALL FIELD

POSED

> PRESERVED

• FOREST COVER -INCREASED FROM 13% TO 54% • PRESERVED ATHLETIC AREAS • IMPROVED ARRIVAL EXPERIENCE • FORESTED BUFFER BETWEEN SCHOOL AND ONONDAGA CREEK FOR FOREST WALK CONNECTION

N

0 20 40

80

PRESERVED ATHLETIC SPACE

INCREASED

PLANTINGS



INCREASED ARRIVAL PLANTINGS

> FOREST COVER -INCREASED FROM 9% TO 46% PRESERVED OPEN ATHLETIC AREAS IMPROVED ARRIVAL EXPERIENCE OPEN PLAY 'NODES' WITH SENSORY EDGES • PRESERVED CONNECTIONS TO NEIGHBORING COMMUNITY

OPEN NODE WITH SENSORY EDGES

PRESERVED ATHLETIC FIELDS

OPEN NODE

WITH

SENSORY

EDGES

OPEN NODE WITH SENSORY EDGES

160 FT

 $\odot$ 

20 4



• FOREST COVER -INCREASED FROM 17% TO 39% • PRESERVED SELECTED ATHLETIC AREAS • IMPROVED ARRIVAL EXPERIENCE • REPURPOSED BASEBALL FIELD INTO OPEN PLAY 'NODES' WITH SENSORY EDGES • PRESERVED CONNECTION TO NEIGHBORING COMMUNITY

### CREEK RIPARIAN REFORESTATION

ZONE 3 RUNOFF CONTROL GRASSES HERBACEOUS & WOODY PLANTS

SLOW RUNOFF &WILDLIFABSORB& ABSORCONTAMINANTSCONTAMINANTS

ZONE 2 MANAGED FOREST SLOW GROWING TREES & SHRUBS

WILDLIFE HABITAT & ABSORB CONTAMINANTS ZONE 1 UNDISTURBED

FOREST FAST GROWING, FLOOD TOLERANT TREES & REEDY PLANTS

STABILIZE BANK & COOL WATER THROUGH SHADING

### PLANTING PALETTE

ACER NEGUNDO BOX ELDER POPULUS DELTOIDES COTTONWOOD VACCINIUM CORYMBOSUM HIGHBUSH BLUEBERRY POPULUS TREMULOIDES QUAKING ASPEN BETULA NIGRA RIVER BIRCH PLATANUS OCCIDENTALIS SYCAMORE **RIPARIAN** 

> NEPETA CATMINT MALUS FLOWERING CRABAPPLE STACHYS BYZANTINA LAMB'S EAR ACER GRISEUM PAPERBARK MAPLE BETULA PAPYRIFERA PAPER BIRCH CORNUS SERICEA RED OSIER DOGWOOD PEROVSKIA ATRIPLICIFOLIA RUSSIAN SAGE LINDERA BENZOIN SPICEBUSH BETULA ALLEGHANIENSISYELLOW BIRCH

- **QUERCUS VELUTINA BLACK OAK** 
  - GINKGO BILOBA GINKGO 🔘
- A TRIACANTHOSHONEYLOCUST
- 🗛 SERRATA JAPANESE ZELKOVA 🔵
- **CERIFOLIALONDON PLANE TREE**



#### ANNUAL BENEFITS PER ONE TREE OF EACH SELECTED SPECIES



#### **5 YEAR** GROWTH PROJECTION

STRATEGICALLY OVER-PLANT TO CREATE D A FULL-FOREST EFFECT PIONEER SPECIES AND FAST GROWING PLANTS ESTABLISH



### **10 YEAR** GROWTH PROJECTION

MANAGED REMOVAL OF CERTAIN TREES SHRUB LAYER AND DENSE CANOPY BEGIN DEVELOPING



### **20 YEAR** GROWTH PROJECTION

SLOW-GROWING SHADE TREES OUTCOMPETE PIONEER SPECIES AND STRATEGIC MANAGEMENT FACILITATED THE DEVELOPMENT OF A HEALTHY, DENSE CANOPY COVER





### SENSORY EDGES

### UNCOMMON & INTERACTIVE PLANTING

**TOUCH** SOFT, INTERESTING PLANTS THAT WELCOME A CHILD'S TOUCH

**SMELL** FLOWERS, LEAVES, AND TWIGS WITH INTRIGUING SCENTS

> **TASTE** EDIBLE FRUITS THAT ARE SAFE FOR CHILDREN

SEE VISUALLY STIMULATING COLORS & TEXTURES OPEN UNDERSTORY FOR SIGHTLINES & SAFETY

### MANAGED FOREST WITH OPEN UNDERSTORY

SOFT TACTILE EDGES

NODES OF OPEN PLAY

### PUBLIC ART & THE URBAN FOREST



ART: BENCH IV I MATTHIAS NEUMANN I CHAPEL HILL SCULPTURE TRAIL

ART: THE RED RIBBON I TANGHE RIVER PARK I TURENSCAPE

#### SITE SPECIFIC | UNIQUE | INTEGRATED | SUBTLE | INTERACTIVE

PROVIDE SPACE AND OPPORTUNITY FOR LOCAL ARTISTS TO TRANSFORM THE URBAN FOREST THE ONLY GUIDELINE: **SAFETY AND INTERACTIVITY** ALLOW ARTISTS FREE REIGN ON AREAS ALONG THE FOREST WALK TO SEAMLESSLY BLEND ART FORM INTO THE LANDSCAPE

### ART YOU DISCOVER

# CONCLUSIONS

A VISION OF THE CITY OF SYRACUSE EXPANDING ITS POTENTIAL AS AN INTERCONNECTED SYSTEM OF PHYSICALLY AND MENTALLY RECHARGED STUDENTS AND COMMUNITY MEMBERS WHO LIVE, WORK, AND LEARN TOGETHER UNDER THE CANOPY OF A THRIVING URBAN FOREST AND PUBLIC ART EXPERIENCE.

### **OPPORTUNITY**

TO CREATE A COHESIVE NEIGHBORHOOD ENVIRONMENT SURROUNDING OUR SCHOOLS AND ENHANCE THE ECOSYSTEM

### EDUCATION

USING THE URBAN FOREST AND PUBLIC ART AS A UNIQUE, INTERACTIVE, AND EXCITING LEARNING ENVIRONMENT TO EXCITE AND ENGAGE STUDENTS

### CONNECTION

FORM PHYSICAL AND SOCIAL CONNECTIONS BETWEEN SCHOOLS, NEIGHBORING RESIDENTS, PUBLIC ART AND THE URBAN FOREST

### HEALTH

REAP THE PHYSICAL AND PSYCHOLOGICAL BENEFITS ASSOCIATED WITH PROXIMITY AND INTERACTION WITH OUR NATURAL SYSTEMS

#### **THE NEXT STEPS!**



### Biophilic School Sites for the Syracuse City School District

A thesis submitted in partial fulfillment of the requirements for the Master of Science Degree in Landscape Architecture

### **Thesis Committee**

- Major Professor: Emanuel Carter, MRP, SUNY-ESF Department of Landscape Architecture
- Committee Member: Stewart Diemont, Ph.D., SUNY-ESF Department of Environmental Biology
- Committee Member: Eric Greenfield, Ph.D., Forester, Northern Research Station, USDA Forest Service
- Committee Member: Stephen Harris, MS, City Arborist, Syracuse Department of Parks, Recreation and Youth Programs



Biophilia



### **Forest Bathing**



### **Attention Restoration Theory**



### **Stress Reduction Theory**



### Other Studies



Challenges of Syracuse City School District

### **Prospective New Resident's Perception**



### **Enrollment data**


### **Grades 3-8 ELA Assessment**



### **Grades 3-8 Mathematics Assessment**



### **Chronic Absenteeism**

Chronic Absenteeism									
Subgroup	Baseline	Students Enrolled	Students Chronically Absent	Chronic Absenteeism Rate					
Dr. Weeks Elementary	35.3	638	202	31.70%					
H.W. Smith PreK-8	23.2	788	171	21.70%					
LeMoyne Elementary	31	320	76	23.80%					
NYS Elementary/Middle	12.4	1,625,311	253,258	15.60%					

# **Staff Qualifications** (2018-19)

Staff Qualifications (2018-2019)								
	Inexperienced Teachers	Inexperienced Principals	Teachers Teaching out of Subject/Certification					
Dr. Weeks Elementary	51%	100%	4%					
H.W. Smith PreK-8	26%	0%	11%					
LeMoyne Elementary	25%	0%	10%					
State Wide	16%	28%	11%					



### Methods

- analysis of the site and its context
- research through design
- applied concepts described in the literature
  - managed succession
  - forest fragments,
  - forest bathing.

## Designs

### Dr. Weeks Elementary School











### H.W. Smith PreK-8









### LeMoyne Elementary School













#### **Pre-Planning**

#### Installation & Maintenance



### **Invasive Management**



#### Meadow Management



### **Plantation Forestry**



### **Rain Gardens**





Abbr.	Cover Class	Description	Points	% Cover ± SE	Area (ac) ± S
н	Grass/Herbaceous		151	30.02 ± 2.04	3.33 ± 0.2
IB	Impervious Buildings		35	6.96 ± 1.13	0.77 ± 0.1
10	Impervious Other		65	12.92 ± 1.50	1.43 ± 0.1
IR	Impervious Road		8	1.59 ± 0.56	0.18 ± 0.0
MD	Meadow		48	9.54 ± 1.31	1.06 ± 0.1
RG	Rain Garden		5	0.99 ± 0.44	0.11 ± 0.0
S	Soil/Bare Ground		37	7.36 ± 1.16	0.82 ± 0.1

### **Environmental Benefits**



### Further Study







### Conclusions

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## **THANK YOU!**