



*PS 41 Photo: Jessica Bruah*

# Recommendations for the Development, Funding & Long-Term Maintenance of Educational Green Roofs

Prepared for: New York City Comptroller Scott Stringer

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## Table of Contents

Introduction.....	2
Public Interest .....	3
School Energy Savings.....	3
Stormwater Runoff .....	5
Natural Habitats.....	5
Combining Nature Deficit Disorder.....	6
Educational Opportunities.....	7
Proposals for Increasing Educational Green Roofs .....	9
An Educational Green Roof Guide.....	10
Identifying Potential Green Roof Sites .....	10
Educational Green Roof Feasibility Study.....	11
Funding Opportunities.....	12
Fundraising and Long-Term Maintenance.....	14
Conclusion .....	16
Appendix	
PS 41 Energy Star Report.....	18
2017 Educational Green Roof Conference Surveys.....	19
PS 41 Third-Grade Student Surveys.....	27
PS 41 Green Roof Before and After Photos.....	31

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*“Let Nature be your teacher.”- William Wordsworth*

## **INTRODUCTION**

From the ancient Hanging Gardens of Babylon to the modern day The High Line in Manhattan, green roofs have existed for centuries because of the numerous environmental benefits they offer to both humans and other species. More recently, green roofs have also provided myriad educational learning opportunities and emotional benefits for students. While the interest among educators and parents to install them on school rooftops continues to grow, persistent funding and construction challenges remain. In this report, we provide compelling evidence about the multiple benefits of educational green roofs and offer recommendations for identifying New York City Department of Education (DOE) buildings that would be good candidates for green roof installations. We also explore potential funding opportunities, and the costs associated with long-term maintenance plans. The DOE operates over 1,800 schools in some 1,300 buildings across all five boroughs; if a portion of them installed green roofs, it would significantly help the City meet its OneNYC sustainability goals while providing environmental education critical for our children’s future.



PS 41 Photo: ©Charles De Vaivre

## **PUBLIC INTEREST**

In 2010, then Manhattan Borough President Scott Stringer hosted the first New York City Educational Green Roofs Conference with the goal of providing school administrators, teachers, and parents the resources they needed to navigate the complicated funding and construction process. Since then, there have been important public school green roof ribbon-cutting ceremonies such as PS 41's Green Roof Environmental Literacy Laboratory, the Bronx Design and Construction Academy's student-installed green roof, and most recently the MS 297 green roof at 75 Morton Street, opening in September 2018. Following-up on the success of Borough President Stringer's first Conference, on November 15, 2017, PS 41 hosted an Educational Green Roofs Conference in partnership with National Wildlife Federation, The NYC DOE Office of Sustainability, and the NYC Department of Environmental Protection (DEP). Over two-hundred participants attended the sold-out event, which confirmed that there is an increasing interest in green roof construction on school facilities. A follow-up survey of attendees (pages 19-26) provided a window into not only how well-received the information was, but also what questions remain. In the questionnaire, participants overwhelmingly requested another follow-up conference.

## **SCHOOL ENERGY SAVINGS**

**NYC public schools emit 32.67% (about 17 million metric tons) of the City's building greenhouse gas emissions.**

According to a December 2017 City report, New York City emitted 52 million metric tons of greenhouse gases (GHG) in 2016. "Buildings continue to be the largest driver, accounting for 66% of total citywide GHG emissions." New York City public schools specifically emit 32.67%

(about 17 million metric tons) of the City's total emissions. Heating and cooling (47%) and electricity use (37%) account for the largest causes of those building emissions.<sup>1</sup>

During PS 41's presentation at the November 2017 Conference, STEM teacher Vicki Sando highlighted the many energy saving and educational benefits the school's green roof has provided since the completion of the project in 2012 and other major renovation work in 2013. Data from the Environmental Protection Agency's Energy Star's Portfolio Manager, an online building energy monitoring tool, details a 20.80% decrease in total greenhouse gas GHG emissions (metric tons CO<sub>2</sub>e) from the school's 2008 energy baseline (see chart on page 18). There was a 21.90% reduction in the annual amount of energy that PS 41 consumes onsite, as reported on utility bills, or Site EUI (kBtu/ft<sup>2</sup>). PS 41's Energy Star Score, which is based on data from national energy consumption surveys, measures how well a property is performing relative to similar properties, when normalized for climate and operational characteristics. The 1-100 scale is set so that 1 represents the worst performing buildings and 100 represents the best performing buildings. PS 41's Energy Star Score increased from a baseline of 81 in 2008 to a current 92 rating - or a 13.60% increase. While monetary figures are not available on Energy Star, it can be deduced that since the green roof's installation, there has been a significant yearly cost-savings for the NYC Department of Education. In addition, according to a June 2012 report by the Natural Resources Defense Council<sup>2</sup> green roofs "reduce greenhouse gas emissions by lessening the amount of energy needed to cool the building and, in some cases, by serving as a means of sequestering carbon." If all the usable roof space on NYC's public schools (2.7 million square feet) was retrofitted with greenery, public schools alone could potentially sequester hundreds of thousands of pounds of carbon annually.

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<sup>1</sup>

<https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GHG%20Inventory%20Report%20Emission%20Year%202016.pdf>

<sup>2</sup> <https://www.nrdc.org/sites/default/files/GreenRoofsReport.pdf>

## STORMWATER RUNOFF

**Green roofs absorb stormwater and can protect our waterways from pollution.**

In addition to reducing energy, educational green roofs are beneficial for reducing large quantities of stormwater runoff because of their absorptive capacity and expansive surfaces. Approximately 60% of NYC's sewer system is combined, which means it combines sewage and stormwater flows during wet weather. When the sewer system is at full capacity, particularly after a heavy rain event, a diluted mixture of rainwater and raw sewage gets released into local waterways. This event is called a combined sewer overflow (CSO). Green roofs act like a sponge to absorb stormwater, which aids in alleviating sudden stresses to NYC's wastewater treatment systems and helps lessen pollution in our waterways.<sup>3</sup> According to reports, a 40-square-foot green roof could capture 810 gallons of stormwater annually.<sup>4</sup> PS 41's green roof features 9,000 square feet of vegetation; using the same math, it could sequester 182,250 gallons of stormwater annually. If New York City public schools' 2.7 million square feet of available rooftop space was retrofitted with vegetation, collectively NYC schools could absorb 55 million gallons of stormwater annually, which would cut a substantial amount of sewage overflow.

## NATURAL HABITATS

**School green roofs provide important protected habitats for native and migratory species and, linked together, create connected wildlife corridors that provide food, water, shelter, and places to raise young.**

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<sup>3</sup> New York City Department of Environmental Protection, *2017 Green Infrastructure Annual Report*, p.38. [http://www.nyc.gov/html/dep/pdf/green\\_infrastructure/gi\\_annual\\_report\\_2018.pdf](http://www.nyc.gov/html/dep/pdf/green_infrastructure/gi_annual_report_2018.pdf)

<sup>4</sup> <https://www.nytimes.com/2007/09/30/opinion/nyregionopinions/30CInorquist.html>



As New York City's population continues to grow, competition for access to green space will become a challenge for the multitude of other species that share the City with human beings. Even the smallest pockets of greenery provide habitat for both native and migratory birds and insects. Educational green roofs can offer a patchwork of habitats throughout the City that link to other green spaces like community gardens and larger swaths of parkland. Also, unlike New York City parks, these green roofs are a quiet refuge for wildlife when school is not in session. On PS 41's green roof, a wide variety of birds - including red-tailed hawks, kestrels, and migrating yellow warblers - have been observed throughout the school year. The insect population is also robust, and the school has planted milkweed, along with other native plants, to aid the declining monarch butterfly population. PS 41's proximity to Washington Square Park, Union Square Park, The High Line, and the Jacob Javits Center's 6.75-acre green roof creates a green pathway of connected habitats or corridors that allow wildlife to travel throughout the City to find food, shelter, water, mates, and places to raise young. Educational green roofs, therefore, also provide valuable opportunities for both students and scientists to conduct research on urban wildlife, such as the research conducted by Jason Alosio,<sup>5</sup> Dustin Partridge,<sup>6</sup> and others.

## COMBATING NATURE DEFICIT DISORDER

**Educational green roofs help provide positive emotional outlets to help relieve stress during the school day and reconnect children with nature.**

Research reveals that outdoor education, greener school grounds, and more outdoor playtime have numerous benefits.<sup>7</sup>

<sup>5</sup> <https://wcs.academia.edu/JasonAloisioPhD>

<sup>6</sup> <https://news.fordham.edu/university-news/more-green-more-birds-more-diversity-2/>

<sup>7</sup> <https://www.childrenandnature.org/research-library/>

They:

- Measurably improve classroom performance in math, science, reading and social studies;
- Help students to learn across disciplines and make them better real-world problem solvers;
- Are particularly effective at helping under-resourced, low-income students perform measurably better in school;
- Increase scores on statewide-standardized tests in basic skills, reading, science, and math;
- Quantitatively increase student motivation and enthusiasm to learn;
- Markedly improve classroom behavior with fewer discipline referrals and related problems;
- Help students concentrate for longer periods and help mitigate attention deficit problems.



PS 41 STEM teacher Vicki Sando provided a green roof survey (examples on pages 27-30) to her second and third-grade students at the end of the 2017-18 school year. One question asked, “How do you feel on the green roof?” A sampling of the responses was: “calm,” “happy,” “free,” “feeling good,” “amazing,” “excited,” and “like I’m in the country.” Children are increasingly facing higher performance expectations and pressures in the classroom and in other school activities, causing increased anxiety levels.<sup>8</sup> Educational green roofs provide positive emotional outlets to help relieve stress during the school day.

## EDUCATIONAL OPPORTUNITIES

**Educational green roofs offer an excellent learning platform for integrating the NYC Department of Education’s new 2018 Science Scope & Sequence by providing an outdoor laboratory for students.**

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<sup>8</sup> Dwyer, Lucy. The Atlantic. *When Anxiety Hits at School*. October, 2014

The NYC Department of Education's new Science Scope & Sequence, released in July 2018, represents a significant change in the way science is designed and implemented for all students.<sup>9</sup> The understanding of three core disciplines will drive student's "three-dimensional learning":

Dimension 1: Science and Engineering Practices (SEPs)

- Scientific knowledge and skills.

Dimension 2: Crosscutting Concepts (CCCs)

- Ways of thinking used by scientists to make sense of the natural world.

Dimension 3: Disciplinary Core Ideas (DCIs)

- Core ideas in each of the science disciplines: physical sciences; life sciences; and Earth and space sciences.

In addition to providing students with the 21<sup>st</sup>-century skills they will require, these new standards encourage them to develop solutions to authentic problems using science, technology, engineering, and math. Also included in the new standards is a strong emphasis on environmental literacy. Students who are environmentally literate possess, to varying degrees:

- Knowledge and understanding of a wide range of environmental concepts, problems, and issues;
- A set of cognitive and affective dispositions;
- A set of cognitive skills and abilities; and



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<sup>9</sup> <https://www.weteachnyc.org/resources/resource/science-scope-and-sequence-pk-8/>

- The appropriate behavioral strategies to apply such knowledge and understanding to make sound and effective decisions in a range of environmental contexts.<sup>10</sup>

From a rooftop “listening walk” for pre-K/1<sup>st</sup>-grade students, to a water-filtration system and stormwater runoff design project for middle school students, to a jobs-training program for high-school students, educational green roofs engage children in hands-on learning. Green roofs also provide a multitude of learning opportunities in other subjects such as English Language Arts, mathematics, social studies, art, health and wellness, and movement. Furthermore, students with learning, physical, sensory, and emotional disabilities can benefit from outdoor education outside the classroom.<sup>11</sup>

## PROPOSALS FOR INCREASING EDUCATIONAL GREEN ROOFS

**Educational green roof projects can benefit from the establishment of a dedicated Task Force to support their development, interagency collaboration, and private-public partnerships.**

While there is substantial interest among educators and parents for installing green roofs on existing school buildings, the process can be confusing, time-consuming, and expensive. Green roof proposals initiated by teachers or parents (in New York City public schools) may fall by the wayside after staff leave, children graduate, or the process becomes too time-consuming.

Most of these projects must be submitted, approved, and managed by the NYC School Construction Authority (SCA), which ensures that any construction follows NYC building code regulations and protects the safety of school staff, students, and the public. Typically, it takes SCA a minimum of three to five years - from proposal submission to installation - to complete a

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<sup>10</sup> <https://naaee.org/our-work/programs/environmental-literacy-framework>

<sup>11</sup> <https://www.theguardian.com/teacher-network/2016/may/01/nature-nurture-pupils-special-educational-needs-outdoor-education>

green roof project. Often, other school building renovations must precede green roof retrofits because of changes to the Certificate of Occupancy (CO) and outstanding building violations that must be rectified before a green roof project can proceed. Fortunately, at this point, SCA has completed numerous educational rooftop additions, and the process is becoming more commonplace - though it remains cumbersome.

## **AN EDUCATIONAL GREEN ROOF GUIDE**

**A new Educational Green Roofs Manual will be available as a free web download in 2019.**

One of the persistent questions resulting from the 2017 Educational Green Roofs Conference survey was about how to initiate a green roof project. Currently, Vicki Sando (PS41) and Emily Fano (NWF) are developing a new *Manual for the Installation of Educational Green Roofs and Associated Curricula (publication date 2019)* which will supplement the *Guide to Installing Green Roofs on Existing School Buildings (2014)*, developed by the NYC Department of Education Office of Sustainability, School Construction Authority, and Department of Environmental Protection's Office of Green Infrastructure.<sup>12</sup> The purpose of the new Manual is to provide interested individuals with the extensive knowledge gained from PS 41's six-year experience installing their green roof and subsequent findings after its opening in 2012. Along with the SCA process, the Manual will offer additional information about developing a compelling proposal, gathering school and community support, fundraising for construction and long-term maintenance, and curriculum integration.

## **IDENTIFYING POTENTIAL SCHOOL GREEN ROOF SITES**

**Candidates for green roofs can be identified in priority stormwater runoff areas and in communities with other needs such as improved air quality and increased green space.**

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<sup>12</sup> <https://www.grownyc.org/files/email/gtl/DOE%20Green%20Roof%20Guide.pdf>

Currently, solar panels are installed and operating on over thirty public school buildings. An additional one hundred solar projects are scheduled for completion over the next few years. Public schools that are not ideal candidates for solar panels could be retrofitted with green roofs - especially those in priority stormwater runoff areas. Appropriate city agencies can identify schools with large roof surfaces in separate or combined sewer systems, and direct drainage areas which would help the surrounding community mitigate runoff by having a green roof. School candidates can be contacted to gauge interest and be required to apply for consideration. A feasibility study would then be conducted.

## **EDUCATIONAL GREEN ROOF FEASIBILITY STUDY**

**Graduate school departments of engineering and architecture can partner with under-resourced schools to help them develop free feasibility studies.**

The first step for a school to begin the green roof inquiry process is that they must work with an architect and engineer upfront to identify the scope of work required for the project, and to obtain cost estimates for the design, engineering, construction and installation. These findings will determine if a green roof project is at all feasible and how much funding will be required to complete the project. Unless schools have parents capable of volunteering their skills in these areas, or the resources to pay for these services, there is little free help available.

A possible solution is for graduate students from engineering and architecture departments in colleges and universities - such as New York University's (NYU's) Tandon School of Engineering,<sup>13</sup> and the Global Design NYU for Innovative Architecture - to partner with under-resourced schools.<sup>14</sup> Teams of graduate students could determine the feasibility of a green roof

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<sup>13</sup> <https://engineering.nyu.edu/>

<sup>14</sup> <http://gdnyu.com/>

for a school and potentially help design the space in partnership with school administrators. The school would save limited resources while the university students would gain valuable real-world project experience. If the school's rooftop is deemed feasible by this preliminary study, the project could move forward to be reviewed and approved by a certified engineer and architect, in theory at a greatly reduced cost.

## FUNDING OPPORTUNITIES

**Simple green roofs may be a lower cost solution to increase the number of educational green roofs.**

Any New York City government agency building renovation is expensive, and green roofs on school buildings are no exception. Typically, the budget can run more than double the cost of a similar project on a private building. Furthermore, many older school buildings have other required renovations, and the facility often does not comply with the Americans with Disabilities Act (ADA) requirements, such as the need for an elevator or lift apparatus that reaches the roof, which may present further complications and expenses. Schools typically apply for Capital Improvement Fund grants with their elected officials over yearly cycles to cover SCA infrastructure construction and green roof installation costs. Once completed, sizable rooftop additions on NYC Department of Education public school buildings, including the required perimeter safety fencing, can cost in excess of two million dollars. School Principals must analyze and project the needs of their school community for several years to determine if an educational green roof, that serves as an outdoor classroom, is a priority for the school.

One solution for reducing costs and installing more green roofs on school building is to install a simple green roof “ancillary.” This would not serve as an outdoor classroom but rather as a working example of a sustainable, vegetative roof. With this type of ancillary roof, no additional accessibility enhancement is required. In this case, a teacher might bring students to the roof to demonstrate the roof’s environmental benefits (evaporative cooling as compared to the “heat island” of a non-vegetated dark, impervious roof). If the school itself is accessible to non-ambulatory students, but the roof is not, the school must also supply a smaller scale example of the green environment (in contrast to a dark, non-vegetated one) in a classroom or outside at ground level, to ensure the same ancillary educational opportunity for all students.<sup>15</sup> A replica could be achieved through the construction - by students - of small-scale green roof models. Such models have been built at Brooklyn New School where teachers



wanted students to learn about green roofs' ability to mitigate stormwater. The school also has an outdoor classroom with a green roof; formerly an old shipping container, the “Eco-Casita” is a permanent installation in the school’s ground-level play yard.

On PS 118’s roof in Queens, the Department of Environmental Protection (DEP), in partnership with the Department of Education, is testing two alternatives to conventional rooftop surfaces: green roofs and blue roofs. Data from the study at PS 118 will be collected to compare the stormwater management performance of green, blue (a roof design that is explicitly intended to store water, typically rainfall), and control roofs during the monitoring period. Because all three

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<sup>15</sup> NYC SCA, The Office of Sustainability, NYC DEP. *A Guide to Green Roofs on School Buildings*. p.2 <https://www.grownyc.org/files/email/gtl/DOE%20Green%20Roof%20Guide.pdf>

surfaces will be on the same building, this pilot will compare costs and benefits under similar environmental conditions.

There are a number of options for schools that are seeking funding to fully or partially cover green roof feasibility studies, installations and other internal costs.

In addition to capital funding grants from Borough Presidents and awards from local City Council members, including submitting Participatory Budgeting proposals, and PTA fundraisers, schools can seek out state and federal grant opportunities, and identify corporate sponsorship or foundation grants. Numerous companies have separate charitable departments and offer either grants or employee volunteers. Schools could also look for grants to conduct research on existing green roofs. It would be helpful to create a database for schools to be aware of all these potential funding opportunities for green roof resources.

## **FUNDRAISING AND LONG-TERM MAINTENANCE**

**Green roof job training programs are one solution for long-term maintenance issues.**

Green roofs are living vegetative systems that require regular maintenance - preferably by professionals in the industry. The school incurs this expense, and it can be a challenge to allocate funds each year when budgets are tight. Parent Teacher Associations (PTA) often foot the costs, but for lower-income schools, this can be cost-prohibitive. A typical yearly maintenance contract, depending on the size of the green roof, can run into the thousands of dollars. There are several ways to offset this cost.

- Hosting PTA fundraisers that incorporate the roof- such as a Star Gazing Night;
- Sponsorship by local businesses to cover supplies and costs;
- Creating a green roof High School training program within the DOE;

- Partnering with Brooklyn Botanical Garden’s Urban Garden Program (BUG) to pair volunteers with schools seeking free green roof maintenance assistance  
[www.bbg.org/community/bug](http://www.bbg.org/community/bug);
- Pooling of school green roof maintenance contracts for reduced rates.



## CONCLUSION

**Climate change solutions need to be enacted expeditiously throughout NYC, and educational green roofs can be impactful as part of a larger initiative.**

Climate change is the most urgent challenge of our time; 2017 marks the 41st consecutive year (since 1977) that global land and ocean temperatures were at least nominally above the 20th-century average, with the six warmest years on record occurring since 2010. Since the start of the 21st century, the global temperature has been broken five times, three of those being set back to back (2014–2016). This year, 2018, is already on track to surpass last year's record. Real, measurable and bold climate change solutions need to be implemented immediately. Regrettably, this is an especially challenging time to tackle these severe issues when forces in Washington, DC are rapidly undoing previous gains.

Fortunately, NYC has historically been a leader in progressive causes and solutions. For example, not that long-ago parents wanted DOE School Food to eliminate the use of Styrofoam lunch trays. However, the price of compostable replacement trays was not immediately feasible because of the higher price tag per unit. In partnership with several other major cities and school districts, School Food used its vast purchasing power to spearhead a cooperative purchasing scheme which lowered the price of compostable alternatives enough to make them attainable. This shift has resulted in millions of Styrofoam trays being eliminated from landfills across the country. Historically, government bureaucracies have often stifled innovation, but now, it is imperative that we collectively consider and test bold new ideas - like leveraging the purchasing power of multiple school districts - to find solutions.<sup>16</sup>

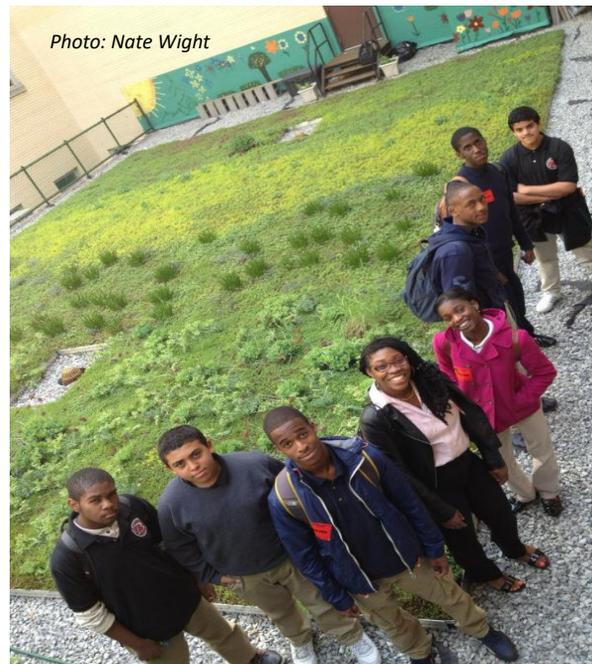
NYC public schools are a neighborhood's bedrock; they have been educating generations of students throughout the five boroughs since 1805 when the first public school opened its

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<sup>16</sup> Layton, Lyndsey The Washington Post, *"Six of the Nation's largest School Districts Dump Polystyrene"*  
May 2015

doors. Moreover, while the focus on schools is what happens inside the building, the benefits to the community can extend to the rooftop! NYC DOE school buildings are as diverse in age, size, structure, and stability as the students who attend these facilities. However, many of the 1,300 public school buildings across the city have rooftops that would be ideal for educational green roof installations. Green vegetation could even be added to the rooftops of the more than 100 solar installations on school buildings currently underway. Research studies show that green roofs can boost the efficiency of solar panel outputs when compared to a traditional solar installation on a black or reflective roof. The vegetation lowers the surrounding air temperature through plant transpiration and air flow. Plants also reduce airborne pollution and dust particles, allowing the panels to absorb more sunlight.<sup>17</sup>

Even if a fraction of the NYC DOE's 1,300 school building rooftops were converted to green spaces, it would positively impact the surrounding community, reduce energy use for heating, cooling and electricity, thereby helping to mitigate the City's greenhouse gas emissions. Additionally,



school rooftops are often vast, flat surfaces that can productively be used to mitigate stormwater runoff and help keep our waterways cleaner while providing habitats for local and migratory species. Installing green roofs on a fraction of NYC's school buildings will provide substantial educational, psychological, and health benefits for future generations of children.

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<sup>17</sup> SunRoot\_SolarGardenRoof\_Study.pdf

**MyPortfolio** | Sharing | Reporting | Recognition

**M041-0100057**

116 West 11th Street, New York, NY 10011 | [Map It](#)

Portfolio Manager Property ID: 1634600

Year Built: 1957

[Edit](#)

[Not eligible to apply for ENERGY STAR Certification](#)

**ENERGY STAR Score (1-100)**

**Current Score:** 92

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**Baseline Score:** 81

Summary | Details | Energy | Water | Waste & Materials | Goals | Design

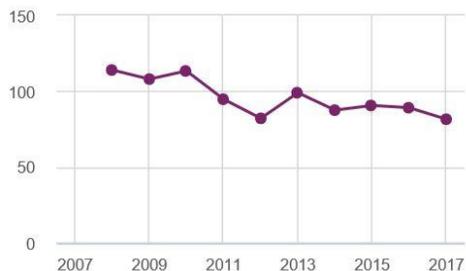
**Property Profile** ([Future enhancements](#))

This section will be deleted in 2018, except for the property photos which will remain. [More information.](#)

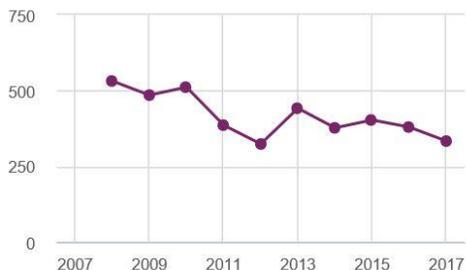
[+ Create Profile](#)

[Change Metrics](#)  
[Change Time Periods](#)

**Source EUI Trend (kBtu/ft<sup>2</sup>)**



**Total GHG Emissions Trend (Metric Tons CO<sub>2</sub>e)**



Metric	Jun 2008 (Energy Baseline)	Feb 2018 (Energy Current)	Change
ENERGY STAR Score (1-100)	81	92	11.00 (13.60%)
Source EUI (kBtu/ft <sup>2</sup> )	111.0	91.6	-19.40 (-17.50%)
Site EUI (kBtu/ft <sup>2</sup> )	68.8	53.7	-15.10 (-21.90%)
Energy Cost (\$)	182,581.71	<a href="#">Not Available</a>	N/A
Total GHG Emissions Intensity (kgCO <sub>2</sub> e/ft <sup>2</sup> )	5.3	4.2	-1.10 (-20.80%)
Water Use (All Water Sources) (kgal)	<a href="#">Not Available</a>	<a href="#">Not Available</a>	N/A
Total Waste (Disposed and Diverted) (Tons)	<a href="#">Not Available</a>	<a href="#">Not Available</a>	N/A

**Check for Possible Data Errors**

Run a check for any 12-month time period to see if there are any possible errors found with your data.

[Check for Possible Errors](#)

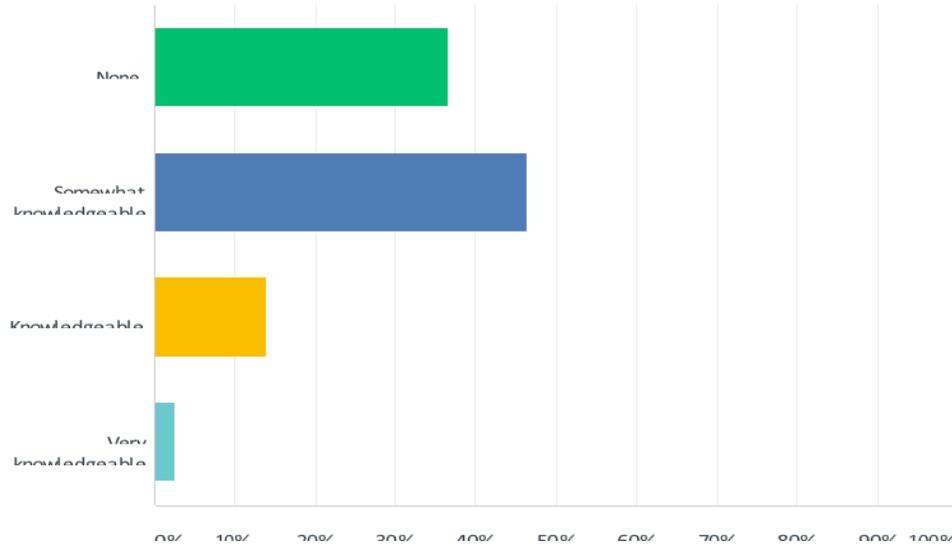
**Sharing this Property**

**46 People Have Access to this Property**

Name	Permissions	Action
<a href="#">Jeremy Shannon</a> (jshannon@nycsca.org)	<a href="#">Read Only Access</a> Shared by <a href="#">Office of Sustainability</a>	I want to... <input type="text"/>
<a href="#">Jocelyn Cohen</a> (JOCELYNCOHEN)	<a href="#">Read Only Access</a> Shared by <a href="#">Office of Sustainability</a>	I want to... <input type="text"/>

### Q1 Before the Educational Green Roofs Conference, what was your general knowledge about installing green roofs on school buildings?

Answered: 71 Skipped: 0

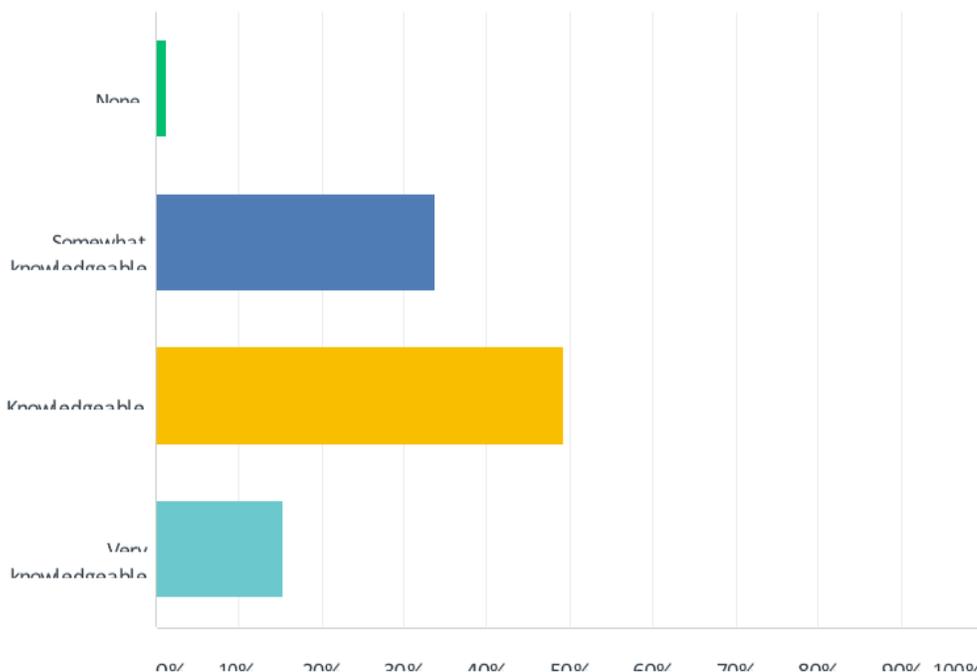


ANSWER CHOICES	RESPONSES	
None	36.62%	26
Somewhat knowledgeable	46.48%	33
Knowledgeable	14.08%	10
Very knowledgeable	2.82%	2
<b>TOTAL</b>		<b>71</b>

### Q2 After the Conference, what is your knowledge about installing green roofs on school buildings?

Answered: 71 Skipped: 0

### Educational Green Roofs Conference Feedback

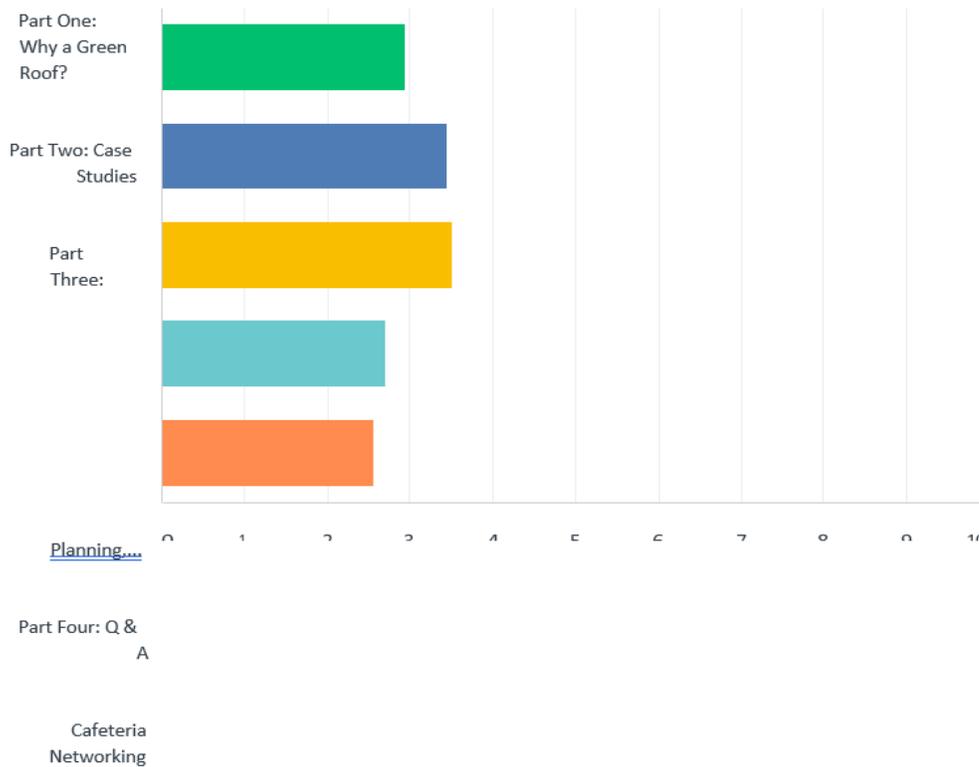


ANSWER CHOICES	RESPONSES
None	1.41% 1
Somewhat knowledgeable	33.80% 24
Knowledgeable	49.30% 35
Very knowledgeable	15.49% 11
<b>TOTAL</b>	<b>71</b>

### Q3 What part of the Conference was most helpful for you?

Answered: 70 Skipped: 1

## Educational Green Roofs Conference Feedback



	1	2	3	4	5	TOTAL	SCORE
Part One: Why a Green Roof?	25.53% 12	12.77% 6	19.15% 9	17.02% 8	25.53% 12	47	2.96
Part Two: Case Studies	26.79% 15	23.21% 13	26.79% 15	14.29% 8	8.93% 5	56	3.45
Part Three: Planning, Construction, Maintenance & Engagement	31.58% 18	29.82% 17	14.04% 8	7.02% 4	17.54% 10	57	3.51
Part Four: Q & A	6.52% 3	19.57% 9	28.26% 13	30.43% 14	15.22% 7	46	2.72
Cafeteria Networking	13.46% 7	15.38% 8	17.31% 9	23.08% 12	30.77% 16	52	2.58

### Q4 Why did you attend the Conference?

Written Samples:

- I would like to expand the green roof at our school.
- Would like at Roof Top Garden at our school
- My children's school is constructing a roof garden.
- To learn more about the process and get future ideas for implementation
- To learn how we can help schools in our watershed install green roofs or other GI, to provide resources to educators that need GI curriculum

## Q5 How will you use the information gained from the Conference?

Answered: 69 Skipped: 2

### Written Samples:

- As information to help my administrators see the value of educational green roofs and some practical advice
- I am going to use the information I received to help me with further research as I learn more of what to do to get this project commenced
- More details about the construction process as I had no idea what all was entailed
- I will create relationships with the partners tabling and making use of their stem curriculum resources
- mostly for scheduling green roof visits and using information gained to plan lessons on green roofs with students
- planning, budgeting, implementation, curricula alignment, and everything else
- To attempt to put a GR on our school
- Visit other green roofs; brainstorm and turn key back to my Green Team.
- Follow up and research on how to get it started on creating a green roof.

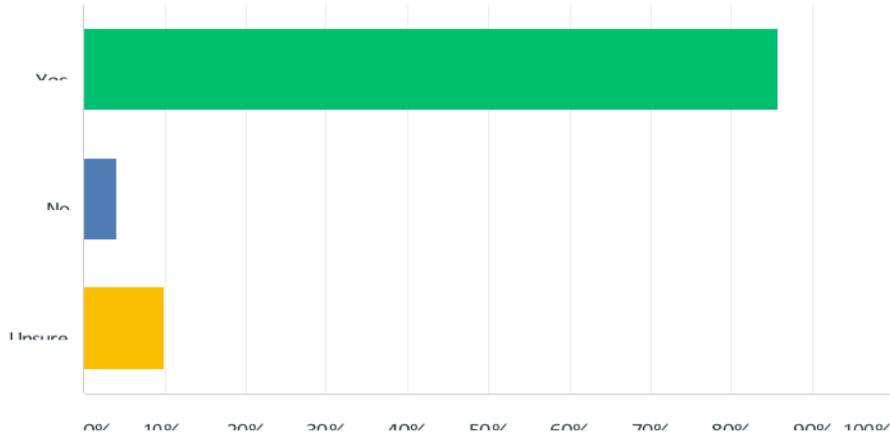
## Q6 What information would you like to see included in future Conferences?

Answered: 63 Skipped: 8

- Written Samples:
- A clear networking group that allows for people to work together and have clear resources (informational and human resources) to help through the process.
- More hands-on interaction - maybe physical models of green roof's and case studies at stations so you can talk with others more
- More detailed sessions on each step of the process
- More time for networking and more partnerships, share all materials in an email after the conference ..links and curriculum materials
- Field study and trips to educational green roofs since we lease our building and its not structural able to handle a green roof
- more case studies, more key speakers, rooftop garden visits, movies of rooftop gardens
- More info/contact with the SCA
- I think it was a great idea to have a list of SCA approved contractors for these projects ready for people, contact sheet with attendees and panel info

### Q7 Would you find a Green Roof Curriculum Guide useful?

Answered: 70 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	85.71%	60
No	4.29%	3
Unsure	10.00%	7
<b>TOTAL</b>		<b>70</b>

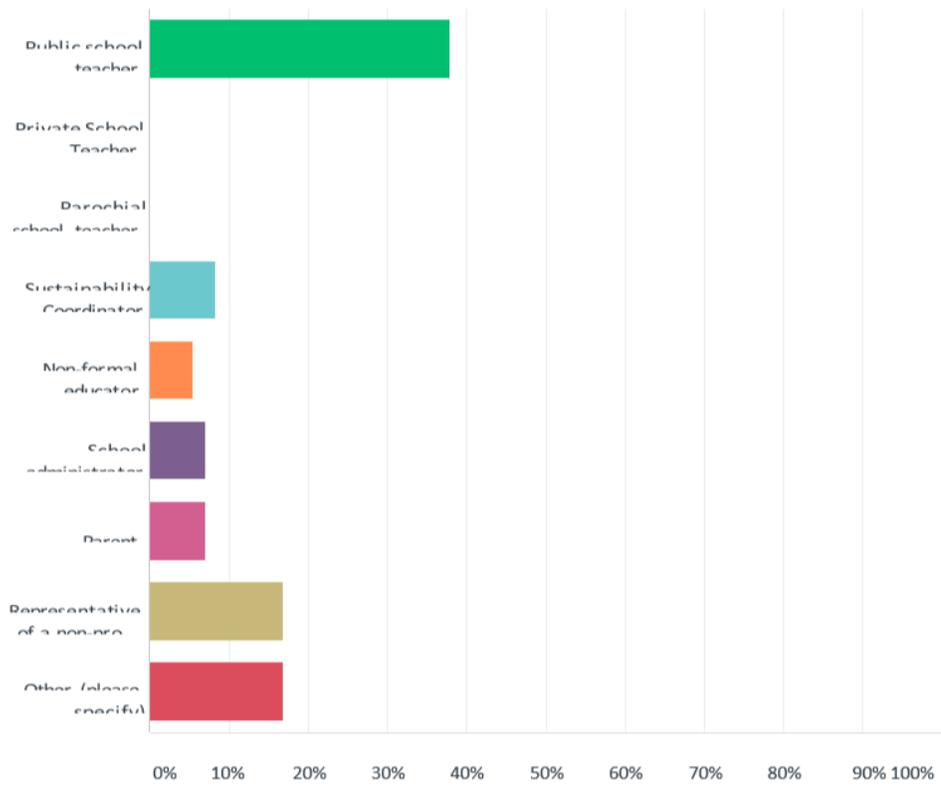
### Q8 Please tell us who you are

Other (please specify)	16.90%	12
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## Educational Green Roofs Conference Feedback

<b>TOTAL</b>	<b>71</b>
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Answered: 71    Skipped: 0



ANSWER CHOICES	RESPONSES	
Public school teacher	38.03%	27
Private School Teacher	0.00%	0
Parochial school teacher	0.00%	0
Sustainability Coordinator	8.45%	6
Non-formal educator	5.63%	4
School administrator	7.04%	5
Parent	7.04%	5
Representative of a non-profit organization	16.90%	12

### Q9 Please provide your contact information if you are willing (optional)

Answered: 57 Skipped: 14

ANSWER CHOICES	RESPONSES	
Name	100.00%	57
School or Organization	96.49%	55
Address	85.96%	49
Address 2	0.00%	0
City/Town	91.23%	52
State/Province	0.00%	0
ZIP/Postal Code	91.23%	52
Country	0.00%	0
Email Address	98.25%	56
Phone Number	80.70%	46

Green Roof Survey

1. What is your favorite thing to do on the green roof?

Relax + learn

2. How do you feel when you go on the green roof?

Calmed

3. Why are green roofs good to have on school buildings?

To make it cooler without electronics.

4. What is something you would like to learn more about green roofs?

How do plants die?

5. What could we add to our green roof to make it better?

A 3 foot windmill beside the nature

6. Would you like to learn more about green roofs in class? If so, why?

Yes because green roofs are like part of our family.

Green Roof Survey

1. What is your favorite thing to do on the green roof?

Look at the plants  
and wildlife.

2. How do you feel when you go on the green roof?

I feel as if I'm in a field.

3. Why are green roofs good to have on school buildings?

Green roofs are good to  
have on school buildings because they  
absorb the carbon dioxide.

4. What is something you would like to learn more about green roofs?

What animals live on  
green roofs.

5. What could we add to our green roof to make it better?

grass snakes,

6. Would you like to learn more about green roofs in class? If so, why?

Yes because it will help us find  
out the ecosystem up there.

Oliver

1. What is your favorite thing to do on the green roof?

looking at flowers because there beautiful.

2. How do you feel when you go on the green roof?

I feel fresh and happy, not.

3. Why are green roofs good to have on school buildings?

to keep class room cool & to observe.

4. What is something you would like to learn more about green roofs?

I want to learn about green roof? Is  
how water cant get through roof?

5. What could we add to our green roof to make it better?

more plants because to keep more cooler.

6. Would you like to learn more about green roofs in class? If so, why?

I do because I want to learn more  
about how the air gets through the roof?

1. What is your favorite thing to do on the green roof?

Look around!

2. How do you feel when you go on the green roof?

FREE! FREE! FREE! FREE!!!

3. Why are green roofs good to have on school buildings?

They are good for the the bugs are nature.

4. What is something you would like to learn more about green roofs?

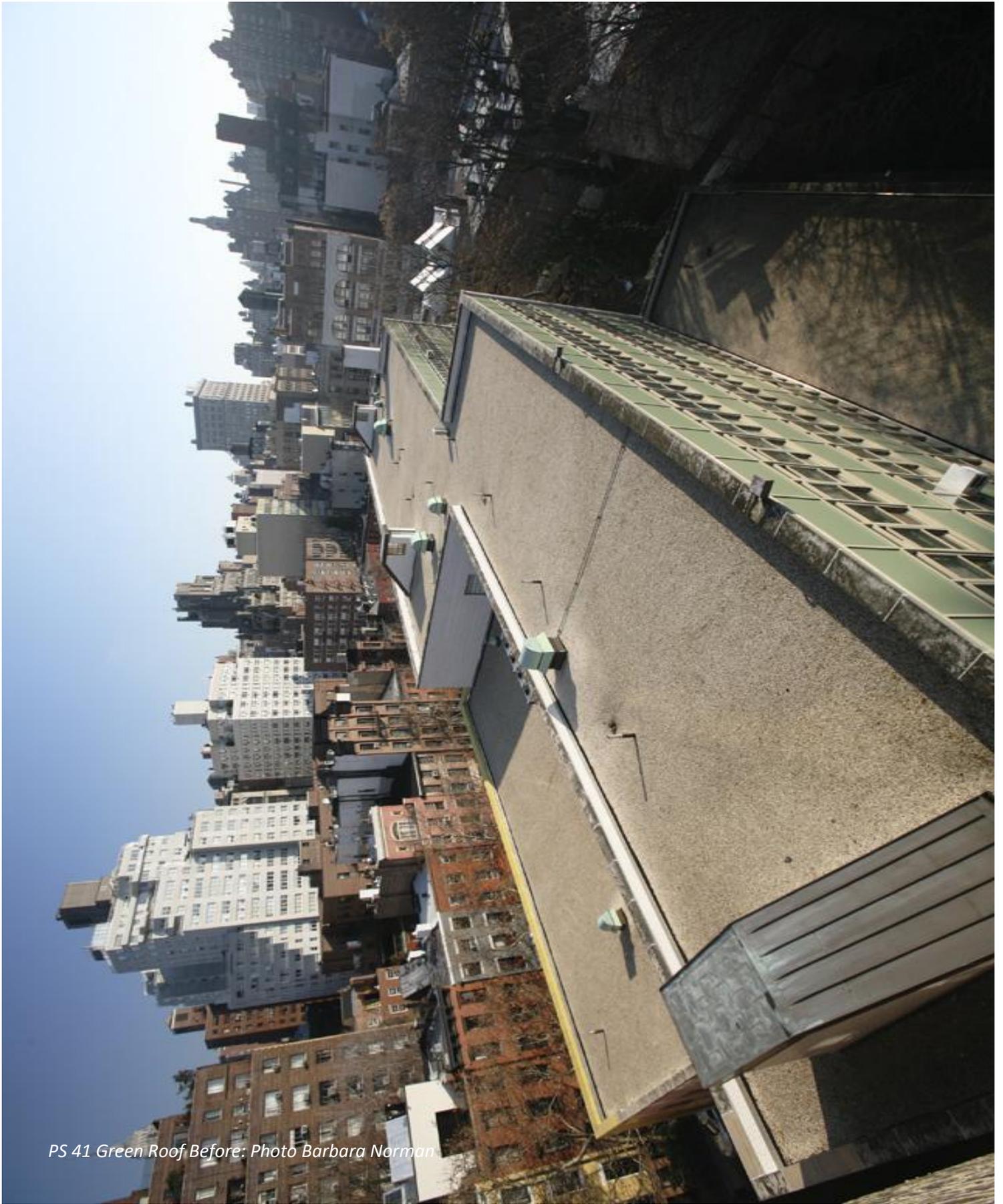
I would like to learn more about the wild-life.

5. What could we add to our green roof to make it better?

More ~~the~~ animals.

6. Would you like to learn more about green roofs in class? If so, why?

I would because I love the wild-life, and I love to learn.



*PS 41 Green Roof Before: Photo Barbara Norman*



*PS 41 Green Roof After: Photo Barbara Norman*

