Green Roofs at OWU

Ohio Wesleyan University and the City of Delaware

Environmental Geography, Professor John Krygier (jbkrygier@owu.edu), Fall 2019

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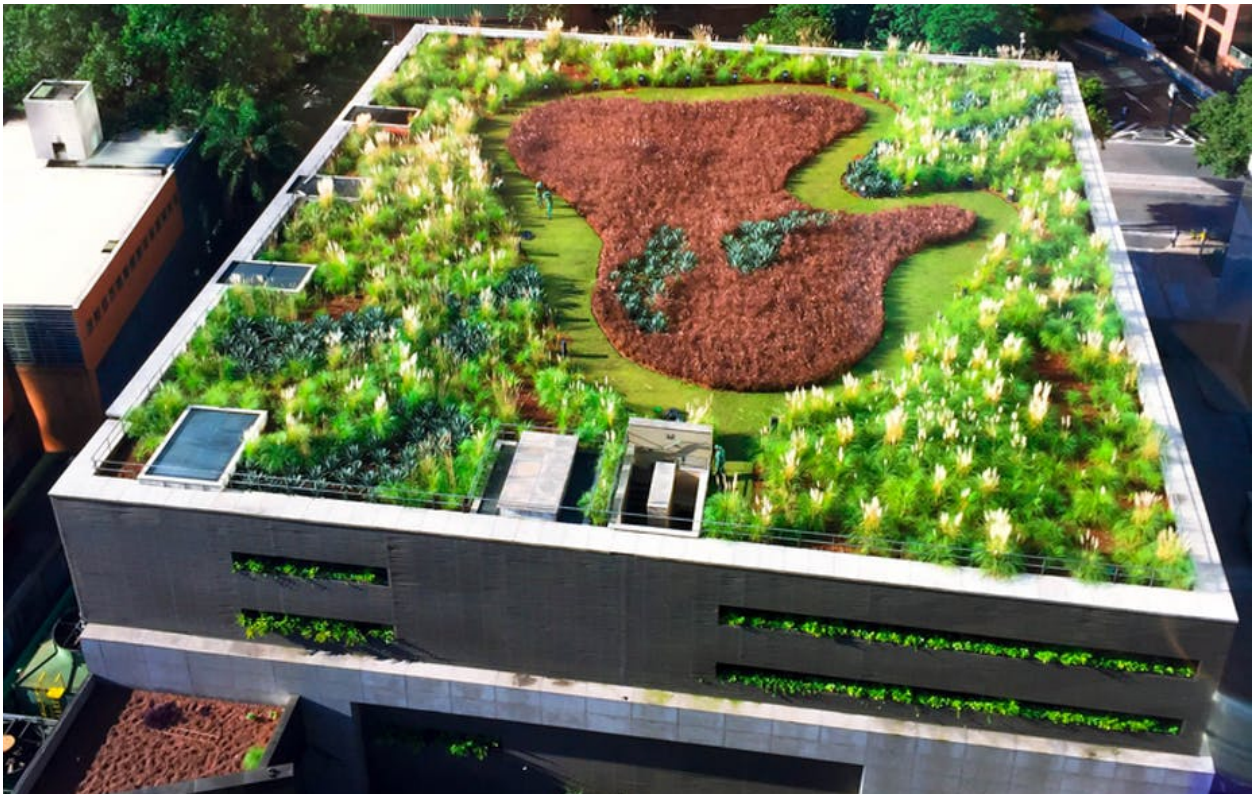

An example of a green roof using a variety of plants

The Problem:

Currently, the City of Delaware does not treat its storm-water before discharging it into larger waterways due to its MS4 permit, which can lead to non-point source pollution. MS4 permits authorize cities, counties, or other governmental entities to discharge storm-water collected by their storm sewer systems to waters of the United States. This kind of pollution can augment to cause eutrophication or algal blooms, such as that which has occurred in Lake Erie. Ohio Wesleyan University (OWU) is located in a hilly location and a city that produces more rainfall per year than Seattle (38 inches versus 37.5 inches), creating the potential for relatively high levels of storm-water runoff. Installing a green roof to prevent polluted storm-water runoff is an example of executing best storm-water management practices and a practical solution for addressing the problem.

Project Summary:

The aim of this project is to install a ~ 5500 sq ft green, sedum plant roof on the Delaware Entrepreneurial Center (DEC). This location is ideal because it is central to both OWU and Delaware. This project, initially proposed by the City of Delaware to manage storm-water, would benefit the student population, the university administration, the Delaware community, and the campus as a whole in multiple ways. Thus far we have investigated the feasibility of this project, researched its benefits, discerned key stakeholders and supporters, addressed safety and accessibility concerns, created a budget and implementation timeline, identified sources of funding, and considered maintenance planning.

These mark-ups provided by Jonathan Stechschulte show what a green roof at OWU could potentially look like

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Student Benefits:

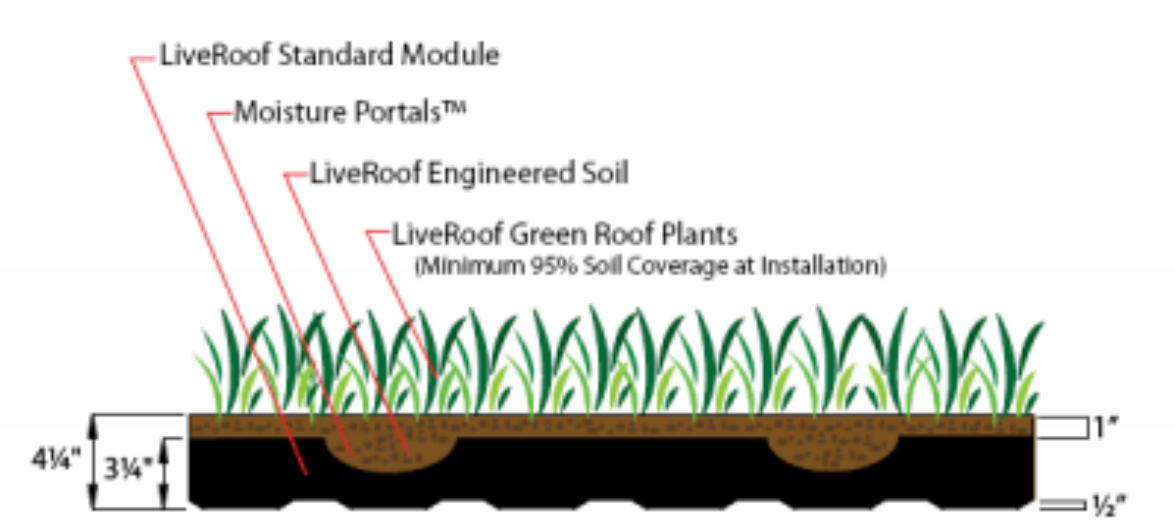
- Student exposure to nature has been correlated with higher academic performance in the humanities and natural sciences.
- Studies have also demonstrated that exposure to nature eases symptoms of ADHD.
- Students who are engaged with green roofs are given the chance to interact with a real world example of storm-water management, climate control, and air quality improvement and monitoring.
- A green space provides a respite from long labs by relieving eye strain, reducing mental fatigue, and improving focus.

- Integrating plants into workplaces yields productivity gains and reduced psychological stress.
- Affords students the opportunity to pursue correlating research projects.
- Allows professors to integrate tangible, hands-on learning experiences.
- Acts as a catalyst in pursuing National Science Foundation research funding.

Campus-wide Benefits:

- Fulfills the OWU Sustainability Plan and the UN's Sustainable 2050 commitments to a sustainable future, reducing our impact on climate change, increasing our health and well-being, and living better on campus and on Earth.
- Extend the roof's lifetime by 200-300%.
- For conservation, plants and soil help recreate habitats for pollinators such as bees, butterflies, insects, and songbirds.
- Eliminating non-point source pollution. Filtering and slowing down storm water runoff and surges to protect groundwater, lakes and streams.
- Reduce energy (HVAC) costs significantly; on average green roofs save ~$10,000/year on heating and cooling costs.
- Attracts more environmentally-inspired students to Ohio Wesleyan.
- Serves as a symbol of OWU and the City of Delaware's joint commitment and effort to promote sustainability and collaboration in our community.

Components:



https://liveroof.com/products/modules/

- LiveRoof (consisting of mostly year-round sedum perennials) on top of the DEC
- Elevator and stairs, making the project ADA compliant
- Permeable RoofStone pavers, from LiveRoof, to promote walkability and permeable surfaces for storm-water
- Railings around the roof, following safety regulations
- Signage such as a donor recognition plaque, informational signs, and safety warnings
- Landscaping sail for providing classes with shade (optional)
- Tables and chairs for student research, leisure, or studying

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Budget:

Item	Company	Cost per item	Amount	Total	Note
Structural Engineer	TBD	$ 3,500.00	1	$ 3,500.00	
Green Roof (5500 sqft)	LiveRoof	$ 80,774.47	1	$ 80,774.47	
Project Specific Plant Mix	LiveRoof	$ 3,740.00	1	$ 3,740.00	
Nursery Installer	Meyers Landscaping/TBD	$ 5.50	5500	$ 30,250.00	National average for an extensive green roof installation per sq ft
Shade	We Do Playgrounds	$ 2,000.00	1	$ 2,000.00	
Safety Railing	Wanner Metal Worx	$ 10,000.00	1	$ 10,000.00	
Stairs	Wanner Metal Worx	$ 10,000.00	1	$ 10,000.00	
Elevator	Precision Lift Industries	$ 16,000.00	1	$ 16,000.00	
Contingency Fund				$ 24,000.00	(15% of original total of 160,864.47)
Total				**$ 180,264.47**	
Pending EPA grant				$ (30,000.00)	January deadline
Adjusted Total				**$ 150,264.47**	

Proposed Sources of Funding:

- WCSA Campus Experience Initiative Funding
- Grants: EPA Educational Grant, OWU Theory-to-Practice Grant (partial matching funds), National Science Foundation
- Alumni donors and community partners
- Departmental funds

Recommendations/Implementation Plan: (Expected installation time required: about 2-3 weeks)

1. Hire a structural engineer to provide a detailed analysis of various roofs on campus, starting with the DEC roof, to determine if the project should continue as planned.
2. Install stairs and guardrails first through Wanner MetalWorx in order to provide certified LiveRoof installers easy access to the roof and to insure their safety.
3. Ask LiveRoof to then deliver their engineered soil, plant modules, sedum plants, and permeable pavers.
4. Contract Meyers, a landscaping company, to install the green roof.
5. Install a Precision Lift elevator for accessibility and ADA compliance.
6. Bring signage and furniture onto the roof.

Prospective Date: Preceding Commencement date of May 9th 2020

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Jonathan Stechschulte, OSU Graduate Student who provided mark-ups

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Appendix

Weight considerations: The roof must be able to accommodate at least 250,000 lbs additional dead load as LiveRoof units adds 30 lb dead load per sq ft, permeable pavers add 50 lb per sq ft, people will add a considerable amount of weight, and equipment such as tables and chairs will also add weight.

Safety consideration: The guardrails, sedum plants, and warning signs will serve as safety measures. The plants will put a considerable amount distance between the paved surfaces and the edges of the roof, preventing students from being able to get close to the edges.

Maintenance: LiveRoof will provide a regular maintenance newsletter with tips and reminders for fertilization. The plants will need to be fertilized 20 times/year by either Building & Grounds (or students). Invasive species will require removal. Maintenance is only a major concern for the first year after installation.

Educational component: Botany professors have expressed their interest in and support for this project. They have offered to incorporate the green roof into their curriculum in some shape or form and to write letters of support.

LiveRoof FAQs