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A GREEN ROOFS FOR HEALTHY CITIES PUBLICATION

VOLUME 22 / ISSUE 3 / FALL 2020

THE AWARDS OF EXCELLENCE ISSUE

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NAOMI DAVIS OF BLACKS IN GREEN TALKS ABOUT THE SUSTAINABLE SQUARE MILE
WHY SCHOOLS AND GREEN ROOFS ARE PERFECT TOGETHER
HOW BROOKLYN GRANGE HAS ADAPTED TO COVID 19

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VOLUME 22
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THE AWARDS OF EXCELLENCE ISSUE

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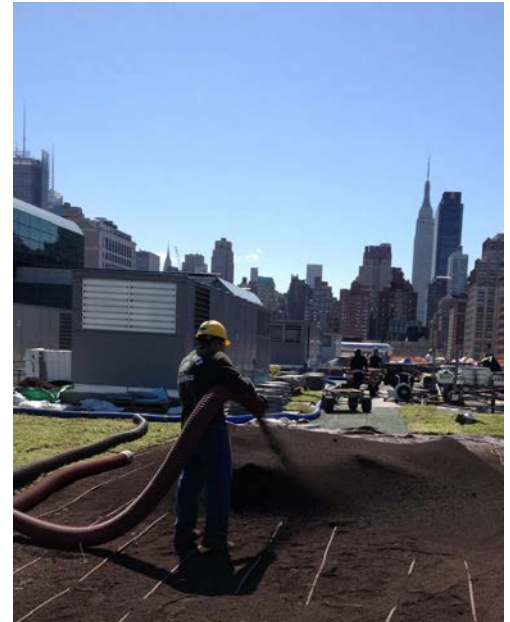
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VOLUME 22 / ISSUE 3 / FALL 2020 - THE AWARDS OF EXCELLENCE ISSUE

THE LIVING ARCHITECTURE MONITOR IS PUBLISHED FOUR TIMES PER YEAR IN PRINT
AND DIGITAL FORMATS BY GREEN ROOFS FOR HEALTHY CITIES (GRHC)

MISSION

Green Roofs for Healthy Cities' mission is to develop and protect the market by increasing the awareness of the economic, social and environmental benefits of green roofs, green walls, and other forms of living architecture through education, advocacy, professional development and celebrations of excellence.

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WHAT A STRANGE AND UNNERVING SUMMER IT'S BEEN

What a hot summer, very hot! It appears we are on track for 2020 to once again be the hottest year ever recorded on earth. This should come as no surprise. Death Valley National Park in California, (a state that is currently on fire), recorded a temperature exceeding 130 F or 54 C, on August 17. Sixty million Americans are currently living under a heat warning as yet another heat wave sweeps across the continent. The sooner we get serious about addressing the urban heat island effect in our cities with green roofs and urban forests the better.

Meanwhile, in the Arctic, which has been warming at twice the global rate for more than 30 years, the last Canadian ice shelf has collapsed. Did you hear about it? It was attached to Ellesmere Island and had an area of 80 square kilometers, larger than Manhattan. It collapsed in July into the ocean and disintegrated. This August, an international team of scientists had more disturbing news regarding the mother of all ice in the north – Greenland. In the year 2019, they reported, Greenland lost a staggering 532 billion tons of ice, enough to cover all of California in more than 1 meter of water or to raise the ocean by 1.5 millimeters – in only one year. Apparently, NASA satellites are able to measure ice loss accurately from space. The rapidly accelerating melting of the Greenland ice sheet spells disaster more quickly for coastal communities worldwide, many of which already suffer from increased flooding during storm surges and high tides. The potential for economic, ecological and social losses due to rising

oceans will dwarf the revenues of fossil fuel companies and no doubt imperil the global economic system. Meanwhile far too many politicians continue to downplay or deny climate change, or simply turn their backs on the science altogether. Manufactured ignorance all too often serves the interests of those in power, or those who serve power and are threatened by change.

The blatant disdain and disregard for science has no doubt been a contributing factor in the successful spread of the COVID 19 virus, which as of August 24, has killed more than 800,000 people worldwide and infected more than 23 million according to John Hopkins Center for Health Security. Measures to limit the spread of the virus have exposed long lasting cracks in our food supply systems, our social safety net and helped to shine a spotlight on racism and inequality. GRHC held a very popular Virtual Symposia on urban and rooftop food production in August which is now available on the Living Architecture Academy. Clearly the pandemic has demonstrated that we need to ramp up urban and regional food production through green infrastructure as an essential component of resilience planning.

Across North America, people of color have suffered disproportionately during the pandemic, with higher rates of infection and mortality. Black Lives Matter protests have been ongoing for months, raising awareness of systematic racism and gaining more widespread acceptance. Clearly it's no longer sufficient to not be a racist. What we all need is to actively become anti-racist.

In that spirit, in July, GRHC hosted a symposium about Chicago and invited Naomi Davis, Founder/Director of Blacks in Green to speak about green infrastructure and gentrification. She delivered a passionate speech, and is now our guest in On the Roof With in this issue of the LAM. With the full support of the board of directors, GRHC has also established a scholarship fund for youth of color so that they can access our training and online events if they wish to pursue a career in living architecture. It's a start, and much more will be required in the years to come to reduce racism and inequality in our communities. Ongoing leadership, and a willingness to change are essential ingredients for success.

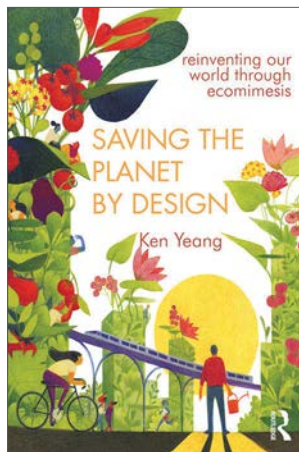
Speaking of success, congratulations to all of the Awards of Excellence Winners for 2020. We have profiled them and will be showing their project videos throughout CitiesAlive Virtual 2020 from October 20 to 23rd. I hope your fall season will be far less tumultuous than the summer of 2020 has proven to be, and invite you to join us for CitiesAlive 2020 to reconnect and rejuvenate.

Sincerely yours,



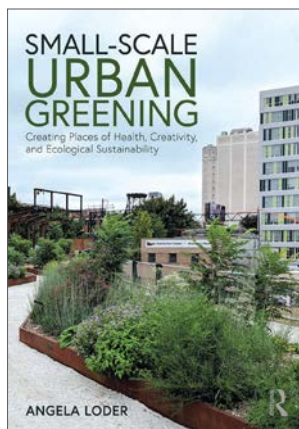
Steven W. Peck,
GRP, Honorary ASLA
Founder and President

Ken Yeang is an architect, ecologist, planner and author from Malaysia, best known for his ecological architecture and ecomasterplans that have a distinctive green aesthetic. He pioneered an ecology-based architecture (since 1971), working on the theory and practice of sustainable design. The Guardian newspaper (2008) named him "one of the 50 people who could save the planet". His latest book, *Saving the Planet by Design: Reinventing Our World Through Ecomimesis*, presents two key principles as the means to carry out these task of saving the planet and humanity – 'ecocentricity' being guided by the science of ecology, and 'ecomimesis' as designing and making the built environment including all artefacts based on the emulation and replication of the 'ecosystem' concept. Adopting these principles is fundamental in our endeavour to save our Planet Earth, and changes profoundly and in entirety the way we design, make, manage and operate our built environment. (2019) Routledge.com. Mr. Yeang will keynote on October 23 at CitiesAlive Virtual 2020.



GRHC announces \$10,000 scholarship program for people of color to help generate opportunities to work in the green infrastructure sector. See greenroofs.org

Dr. Angela Loder is a researcher and strategic planner whose work focuses on the relationship between occupant health, buildings, and urban nature. Her doctoral research looked at the impact that visual and physical access to a green roof in Chicago and Toronto had on office workers' concentration, stress, and creativity. Her latest book, *Small-Scale Urban Greening: Creating Places of Health, Creativity, and Ecological Sustainability* delves into detail about the many health benefits of green roofs and other forms of greening in our cities. Dr. Loder argues that including power dynamics, symbolism, and aesthetics in our understanding of the human relationship to urban nature can help us create places that nurture ecological and human health and promote successful and equitable urban communities. (2020) Routledge.com



Congresswoman Nydia Velazquez has served in the United States House of Representatives since 1993 as a Democrat representing the people of Brooklyn, New York. On July 24 she issued a press release on a bill that would provide funding for the design, installation and maintenance of green roofs on schools across America. Under the proposed program, which is endorsed by Green Roofs for Healthy Cities and dozens of supportive organizations, the Department of Energy would implement a 500 million dollar grant program to implement green roofs on schools, particularly those in disadvantage neighborhoods. "Green Roofs can answer the call for safer schooling: additional outdoor space provides an opportunity to increase social distancing in open air." said Velazquez. Congresswoman Velazquez is the recipient of GRHC's Civic Award of Excellence for her pioneering work on this important legislation.

To read the draft bill which includes support for Green Roof Professionals and the Living Architecture Performance Tool: <https://velazquez.house.gov>

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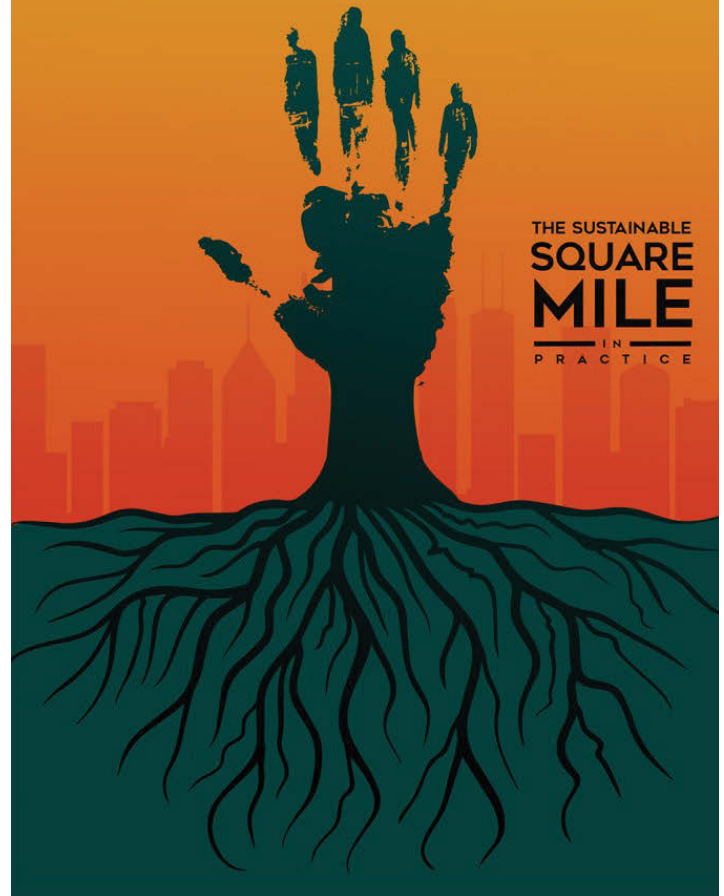
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ON THE ROOF WITH... NAOMI DAVIS, FOUNDER AND PRESIDENT, BLACKS IN GREEN

INTERVIEW BY DAVID YOCCA, FASLA, PLA, GIF BOARD CHAIR

Naomi aims to reinvent her childhood “sustainable-square-mile” here in the Age of Climate Crisis. She is the founder/President of Blacks In Green (BIG™), an urban theorist, attorney, activist, and proud granddaughter of Mississippi sharecroppers. Her heritage forms the foundation for BIG's course in Grannynomics™, The 8 Principles Green-Village-Building™ and The Sustainable Square Mile™ which Naomi authored and teaches nationally in lectures and workshops, and universities.



Naomi serves as a bridge and catalyst among communities and their stakeholders in the design and development of green, self-sustaining, mixed-income, walkable-villages within black neighborhoods – so that every household can ultimately walk-to-work, walk-to-shop, walk-to-learn, walk-to-play – and neighbor dollars can circulate locally to limit the greenhouse gases overheating our planet. She conveys the risks of global warming; the health/wealth opportunities of the new green economy; the power of neighbors to lead in their city’s environmental policy and practice; and the primacy of land ownership.

David Yocca (DY): Naomi, you have a clearly distinct message and mission for the restoration of healthy, vibrant, and prosperous conditions in predominantly black neighborhoods through a comprehensive approach that integrates green infrastructure and best practices in ecology, green building, and planning; this message has been emerging in your own West Woodlawn neighborhood – how did you start to build awareness and appreciation of this vision within your community?

Naomi Davis (ND): Practice, practice, practice! In other words, programs ~ month-after-month, year-after-year, door-to-door, block-by-block, church-to-church, leader-by-leader, issue-on-issue. Sustainable Square Mile organizing is designed to connect folks across silos...to work the streets to the suites...and in the process to grow the capacity of neighbors and subject matter experts to work together to bring the new green economy to the black community, starting literally with growing ~ gardens of all kinds with an initiative we call the West Woodlawn Botanic



Garden, Village Farm & Arboretum, which asks 4 questions: 1) how many households can we feed; 2) how many neighbors can we train and engage; 3) how many jobs and businesses can we create; and 4) how many gallons of stormwater can we divert?

DY: *You have created a number of locally-owned and staffed business enterprises with the skills and capacity for implementation and maintenance of horticultural/landscape services, renewable energy systems, and other GI practices- what are your greatest challenges to growing them sustainably and profitably?*

ND: As black folks, we're masters at doing lots with little...and with my own mother's example before me, I learned to cover a spectrum of strategies from boosting education, to production of goods, to civil disobedience, to neighborhood beautification and more, with pennies on the dollar. And it's a skill that keeps killing us: not expecting, demanding, and mobilizing our fair share of resources for self-help via assets we own: buildings, businesses, and banks. And so, the cliché is true ~ we've been robbed of 'access to capital,' directed instead to the 'overserved' by governments and corporate co-conspirators.

DY: *You are in the process of leveraging neighborhood "resources", including over 90 City or County-owned vacant parcels, to create multiple-benefit gardens, parkways, and green spaces; what would help to propel your vision forward in West Woodlawn?*

ND: We're doing net-positive, sustainable

redevelopment at site scale, but not at the scale intended by our Sustainable Square Mile system, which is for an entire neighborhood, a "walkable-village" such as West Woodlawn. We're slowly growing our comprehensive approach with demonstration projects that illustrate our GI plan; showcase our capacity to build and maintain them; and model potential district-scale performance benefits it will achieve – flood reduction, improved water quality, urban ecology/pollinator habitats, healthy food production, and other revenue-generating activities. We're always building support through partnerships that help us realize our vision, that see the unique value of our "whole-system solution" to pollution and poverty in black communities.

DY: *How can your Sustainable Square Mile approach be adapted to bring green infrastructure solutions to other economically challenged neighborhoods in the Midwest and elsewhere?*

ND: We help neighbors celebrate The City of Villages ~ where every household can walk-to-work, walk-to-shop, walk-to-learn, walk-to-play. We guide neighbors in living BIG's 8 Principles of Green-Village-Building, summoning heritage wisdom from our 12 Propositions of Grannynomics, and through real estate development, literally building the Sustainable Square Mile, where African Americans live, own the businesses and properties, and advance the conservation lifestyle. The Green

Living Room™ is our village epicenter for green training, development, and lifestyle transformation, operating as a sort of modern day safehouse where today's 'freedom seekers' convene to fertilize self-interests. Blacks in Green™ sees every African American neighborhood organized and anchored in this way, living a narrative of triumph, abundance, sovereignty, and joy, financed – one sustainable-square-mile at a time – to design, direct, represent, and benefit from their economic development, with success measured by increase in household income. This is a local living economy as greenhouse gas reduction strategy, where neighbor dollars circulate and the conservation lifestyle becomes standard. This is the BIG vision for self-sustaining black communities everywhere.

DY: *Naomi, your drive and level of enthusiasm are boundless, what do you do to remain energized?*

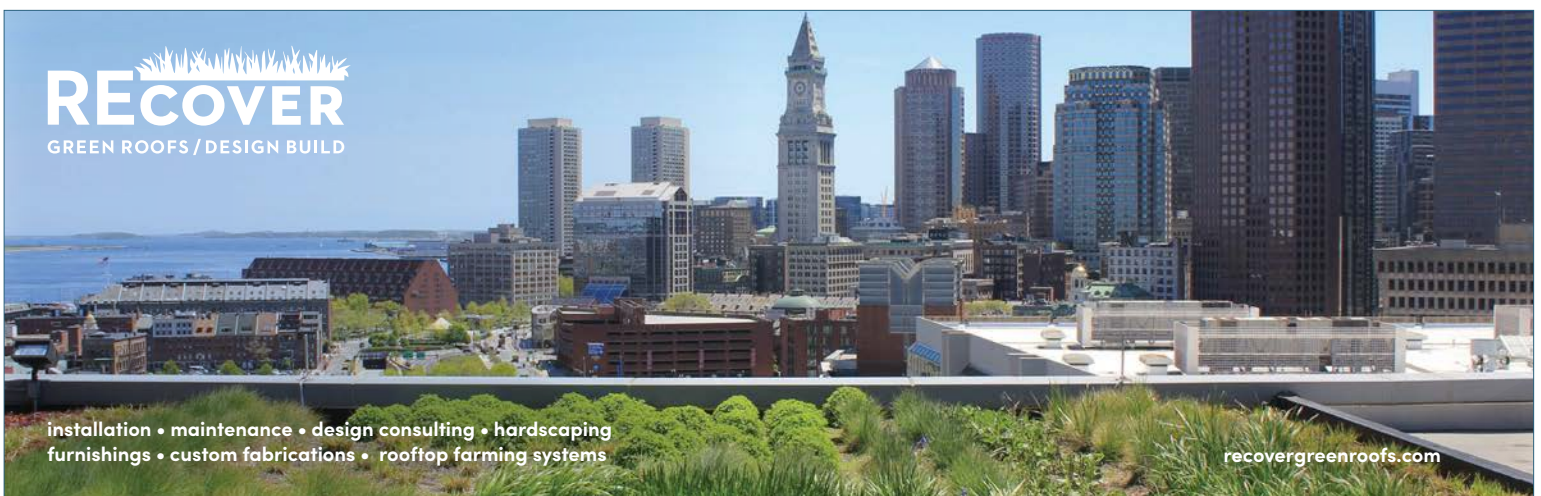
ND: Believing is seeing! I did a 2011 Chicago Ideas Week talk on this idea and a fable of coming back from the future to share how we beat the twin problems of pollution and poverty, reversing our racial health/wealth gap. I see this victory in living color, and it calls me into action, morning till night.

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BLACKS IN GREEN (BIG™)

BLACKS IN GREEN (BIG™ blacksingreen.org/about-us) serves as a bridge and catalyst among communities and their stakeholders in the design and development of green, self-sustaining, mixed-income, walkable-villages in communities owned and populated by African Americans. Founded in 2007 as a national network, they are based in Chicago's West Woodlawn neighborhood, headquartered since October 2019 at the very first Green Living Room™ ~ on the South Lakefront "Cottage Grove Culture Corridor" in the Obama Presidential District. Social enterprises currently in development in their system are:

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BIG URBAN HOMESTEADS™
BIG BUSINESS BACK OFFICE SERVICES™
BIG BOTANIC GARDENS & FARMS™
BIG TREASURE TOURS™
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THE MANY BENEFITS OF SCHOOL GREEN ROOFS DURING COVID-19

BY VICKI SANDO

With the coronavirus continuing to steamroll through regions of the United States, school districts around the country are grappling with reopening strategies.

One possible solution is to shift classrooms outside into the open air, which will help reduce social-distancing challenges and transmission risks, providing emotional benefits (North American Association for Environmental Education, 2020). Underdeveloped school rooftops, especially those in dense urban areas, are prime for installing green roofs, which better utilize school grounds by adding outdoor classroom space and substantially reducing the building's environmental footprint.

In New York City, The Greenwich Village School P.S. 41 plans to increase instruction on its expansive green roof throughout the school day. This will aid in complying with reopening requirements by getting students outside, when possible. The green roof provides ancillary outdoor classroom space that does not conflict with the playground area schedules and is utilized in various school subjects and activities: literacy, math, science, STEM, art, movement, and even counseling. Most importantly, the green roof offers a positive emotional experience for students, who have relayed the following observations:

“I FEEL LIKE I AM
IN THE COUNTRY;”

“IT MAKES ME CALM;”

“I FEEL FREE.”



Additionally, P.S. 41's green roof has also made a positive and significant impact on the environment. Data from the 2019 Environmental Protection Agency's Energy Star's Portfolio Manager, an online building energy monitoring tool, details a 32.70% decrease in total greenhouse gas (GHG) emissions and a 27.80% reduction in Source Energy Usage (EUI) that P.S. 41 consumes onsite from the school's 2008 energy baseline.

In addition to reducing the school's energy usage, the green roof is advantageous for reducing large quantities of stormwater runoff because of its expansive surface and absorptive capacity. The 9,000 square feet of vegetation can sequester roughly 182,250 gallons of stormwater annually, which helps prevent the overburden of New York City's combined

sewer overflow (CSO) systems.

School buildings account for 27 per cent of the city's total municipal energy consumption (New York City Department of Education, 2018). Adding more green roofs on schools will help New York City meet its ambitious climate policy initiatives.

The year 2020 has been a challenging time for education, but it is essential to learn from these challenges and make it a transformative year. Educators and Administrators alike want to continue teaching and assisting students, and the current education model option - inside, brick and mortar - may not be available. Creating more green roofs on school buildings has the potential to allow for continued educational opportunities while providing for increased safety measures. Green roofs increase classroom space, reconnect

students with nature, and help support children's emotional needs. Furthermore, when the weather is prohibitive, the green roof is still providing substantial environmental benefits and cost savings year-round.

This worldwide crisis has forced us to reconsider only educating children inside an indoor classroom. Greening school rooftops is a positive alternative that can have both direct and ancillary benefits for future generations and the environment.

For more information

North American Association for Environmental Education (NAAEE).

(2020) see Guidance for Reopening Schools. Environmental and Outdoor Education: Key to Equitably Reopening Schools. North American Association for Environmental Education. https://cdn.naaee.org/sites/default/files/eepr/resource/files/eeguidance_final_06302020.pdf

New York City Department of Education. (2017). New York City Department of Education Office of Sustainability Annual Report 2017- 2018.

New York City Department of Education. <https://infobub.nyced.org/docs/default-source/default-document-library/sustainability-annual-report-2017-2018.pdf>

Vicki Sando is a STEM Teacher, Author and Green Roof Coordinator.

She founded P.S. 41's green roof and has represented the project in numerous media outlets, consulted on public school green roofs, and published a children's book and curriculum about green roofs. Ms. Sando is also the Education Chair for the New York City Green Roof Researchers Alliance. vickisando.com & educationalgreenroofs.org. ps41.org

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THE BEAUTIFUL PHEMERANTHUS CALYGINUS

BY DR. BRADLEY ROWE, MICHIGAN STATE UNIVERSITY, EAST LANSING



Photo courtesy B. Rowe

In this edition of the Plant Profile, I am going to talk about one of my favorite green roof plants, *Phemeranthus calycinus* (syn. *Talinum calycinum*). The plant also is known by several common names including flame flower, and rock pink.

I was first introduced to this plant about 17 years ago when Ed Snodgrass from Emory Knoll Farms gave me some plugs, some of which were used in a replicated study on a campus roof at MSU and some were planted on my doghouse. For those of you familiar with *T. calycinum*, it is the same plant. Taxonomists recently changed the scientific name from *Talinum calycinum* to *Phemeranthus calycinus*, but I like most people familiar with the plant will still think of it as *Talinum calycinum*.

Phemeranthus calycinus is a herbaceous perennial native to the central southern United States from Texas north to Nebraska and Illinois, west to Colorado and New Mexico, and east to Illinois, Arkansas, and Louisiana. It is rated to grow

within USDA hardiness zones 5 to 9, however, I think that classifying the species as a zone 5 plant is stretching the truth as I have yet to see it survive a Lansing, Michigan, winter (zone 5). Even so, its attributes justify its use as an annual in colder climates and it reseeds itself readily.

The species requires full sun and typically grows 25

cm (10 in) tall with a similar spread. Whether in the landscape at ground level or on a roof, the major attraction is its numerous vibrant flowers that continue to bloom every afternoon from late spring until the first frost. Flower color has been described as everything from purple, magenta, fuchsia, rose red, to rose pink, but I like the term



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hot pink to describe the five to eight petals that make up the flower. The flowers are held on stems that arise above the basal clumps of succulent, blueish green, needle-like leaves that may be up to 5 cm (2 in) long. When grown with sedum, the flowers stand upright above the prostrate sedums, thus providing a vertical interest. These long blooming showy flowers make it an excellent accent plant, but they also work very well when planted in a mass. To quote Ed Snodgrass, “A gentle breeze will set the flowers dancing like hovering butterflies”. Speaking of butterflies, the flowers attract numerous butterflies and bees that serve as pollinators.

Besides its visual attributes, the species is great choice for green roofs due to its high drought tolerance. In its native environment *P. calycinus* is often found in dry environments under full sun growing in rocky or sandy soils that are well drained. This is the environments that also describes typical green roof substrates and growing conditions. Supplemental irrigation is not necessary, but they will perform best with up to 2.5 cm (1 in) of rain per month. Too much water will kill the plants which is why good drainage is essential. Also, they are not subject to any serious insect or disease problems.

As mentioned above, *P. calycinus* is classified as a USDA Zone 6-9 plant and is unlikely to survive a normal Michigan winter. However, it is a prolific seeder and can be treated as a self-sowing annual in such locations as long as bare soil present to give the seed a chance to germinate without being

shaded out. When there is no open substrate it will tend to eventually disappear. This was found to be true in a published replicated study performed on the Communication Arts Building on campus where it died off after five years (Getter et al. 2009. Solar radiation intensity influences extensive green roof plant communities. Urban Forestry and Urban Greening 8: 269–281) and in an unofficial study on my doghouse where it disappeared after two seasons. Whether you call it *Phemeranthus calycinus* or *Talinum calycinum*, it is a great plant for cold climates despite the lack of cold tolerance and even a better plant in warmer climates, especially within its native range. I highly encourage its use on green roofs.

Brad Rowe has been conducting green roof research at MSU since 2000. Research topics include plant selection, growing substrates, carbon sequestration, stormwater runoff, energy conservation, and roof vegetable production. He was the founding co-chair of the GRHC Research Committee and received the GRHC Research Award of Excellence in 2008. Brad also teaches a course on green roofs and walls at MSU. The green roof provides ancillary outdoor classroom space that does not conflict with the playground area schedules and is utilized in various school subjects and activities: literacy, math, science, STEM, art, movement, and even counseling. Most importantly, the green roof offers a positive emotional experience for students, who have relayed the following observations:

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AWARDS OF EXCELLENCE 2020



CIVIC AWARD OF EXCELLENCE CONGRESSWOMAN NYDIA VELAZQUEZ

Green Roofs for Healthy Cities is excited to award Congresswoman Nydia Velazquez for her outstanding contribution to developing green infrastructure policy through the proposed Green School Rooftop Program. If passed, the bill would provide half a billion dollars in funding for design, installation and maintenance of green roofs on schools across the United States with a focus on schools in communities with limited green space.

This bill will help with the safe return of students during COVID and contribute to addressing environmental injustices. Low-income communities predominantly have fewer green spaces for children to access and studies have shown nature has a positive impact on a child's development. The Green School Rooftop Program is a demonstration of what post-pandemic policy should be. Addressing social inequity while creating green jobs and bolstering community resilience.



RESEARCH AWARD OF EXCELLENCE DR. REID COFFMAN

Reid Coffman is an Associate Professor and Director of the Novel Ecology Design Lab NEDlab at Kent State University College of Architecture and Environmental Design. Reid has demonstrated incredible leadership and scholarship in green roof research in North America. Reid has been the Research Chair on the Board of Directors and led the Research Committee for Green Roofs for Healthy Cities since 2017. He is the Editor of the Journal of Living Architecture, a founding member of the Research Committee for Green Roofs for Healthy Cities, and a past fellow with National Wildlife Federation. He was one of the founding members of the prestigious Regional Centers of Excellence in Living Architecture designated by GHRC and GIF. Reid provides leadership at the regional level as the executive director of the Greater Ohio Living Architecture center, a RACE location.

Reid has published extensively in the green roof and green infrastructure research world, which is evidenced by his long list of publications. Reid's biography speaks for itself and demonstrates his vast accomplishments in the green roof research world. However, what isn't reflected in this biography is his dedication to educating students. In all of the work that he does for GRHC, he always focuses on what is best for incoming talent and graduate students in the green roof world. We academics should aspire to emulate Reid in his 'students-first' attitude.



CHAIR'S AWARD OF EXCELLENCE PETER LOWITT, FAICP

Peter Lowitt is one of the founding board members of Green Roofs for Healthy Cities and served as its chair for the first five years. His sharp wit and ability to move quickly and efficiently through an agenda is renown. As past chair, he continues to serve on the board of GRHC and is the co-chair of the Policy Committee, helping to draft resource materials to encourage planners to develop green roof adoption. He has co-authored resource papers on green roofs and presented policy case studies at the American Planning Association annual conference. He developed and taught GRHC's first policy course. Peter also serves on the board of the charitable Green Infrastructure Foundation where he has worked to develop and implement the Green Infrastructure Charrette program. At the local level, Peter has developed innovative green roof and green wall policies in Devens, Massachusetts, where he serves as a Director of the Devens Enterprise Commission.



"The environmental performance at McDonald's headquarters' Omni Green Roof is superlative with outstanding stormwater management and vast biodiversity. It's a testament to how green roofs make the world a better place."

- Molly Meyer, Omni Ecosystems

TAKING A RESTAURANT TITAN INTO ITS NEXT SUSTAINABLE PHASE

Moving McDonald's Corporate Headquarters from Oak Brook to downtown Chicago was a huge shift, with the aim of creating a more collaborative, energetic, and forward-thinking environment to take the restaurant titan into its next phase. Sustainability was at the forefront of the project from the very start and remained the highest priority throughout, with the green roof central to the sustainability objectives.

The entire project team visited numerous green roofs to understand the differing systems and regularly consulted with the green roof team to dial in the project's opportunities and goals. The team pushed the boundaries by increasing media depths and shifting compositions in order to maximize the stormwater management potential. In addition to the advanced green roofs on the upper floors of the building, there are additional green roofs and terraces on the 6th and 8th floors, a large lush interior living wall, and many interior plantings throughout the facility.

The project team selected native plantings and seed mixes to provide habitat and biodiversity attracting pollinators long thought to be missing from the region, and purify the air in the West Loop. They also engaged with a local farming company to harvest the production areas, which continue to provide food, flowers, and other products to staff and the community. This project is a living demonstration of the co-benefits that make green infrastructure truly game changing.

Judges praised this project for its robust design as well as its unique and comprehensive integrations.

CATEGORY

Extensive Commercial/
Industrial/Institutional

PROJECT

McDonald's Headquarters

LOCATION

Chicago, IL

AWARD WINNER

Omni Ecosystems

TEAM MEMBERS

Architect
Gensler

Developer/Owner
Sterling Bay

General Contractor
McHugh

Green Roof and Wall Designer,
Manufacturer, Installer,
and Maintenance Provider
Omni Ecosystems

Labor Subcontractor
Bennett & Brosseau

Landscape Architect
Wolff/Confluence

Landscaping Support
Christy Webber

Plumbing Subcontractor
CW Burns



“When guests explore the Center for Sustainable Landscapes green roof, it helps make clear this notion that we strive to demonstrate at Phipps — that humans are part of the natural world, not separate from it. They can experience first-hand that green buildings aren’t about being “less bad,” rather they are beautiful, engaging spaces that can enhance ecosystem services, which improves both human and environmental health and well-being.”

- Richard V. Piacentini,
President and CEO,
Phipps Conservatory
and Botanical Garden

DEMONSTRATING SUSTAINABILITY TO CATALYZE REAL CHANGE

Part of the Phipps Conservatory’s mission is to advance sustainability and promote human and environmental well-being through action and research. In support of this mission, the objective was to help transform the way people relate the built and natural environments. The project was designed to be an education and demonstration site to explicate the efficacy of sustainability, and the beauty of living in harmony with the natural world. It is the first and only building project to meet five of the highest green certifications.

The project site is home to more than 100 species of native plants, including 50 on the green roof alone, creating habitat, enhancing biodiversity, and assisting in the stormwater management goals, reducing annualized runoff by 85 per cent.

Community and project partners were welcomed early to the project to contribute energy, systems, computational fluid dynamics modeling, restoration ecology, green building, innovative technology, life cycle assessment and other consulting services. Partnerships were sought with the goal of pursuing environmental research, education and outreach through the involvement of scientists, research fellows and department members so that collaborative research opportunities could create a “critical mass” and enhance the ability to obtain grants for research of greater scope and importance. Many organizations, associations, government officials, university faculty members and students were invited to participate in early charrettes while a select groups of interested stakeholders were further invited to continue through the design, construction and operational monitoring process as main project partners.

Judges praised this project for its high level of living systems integration for multiple benefits and commitment to engaging multiple stakeholders.

CATEGORY

Intensive Commercial/
Industrial/Institutional

PROJECT

Center for Sustainable
Landscapes

LOCATION

Pittsburgh, PA

AWARD WINNER

Phipps Conservatory
and Botanical Gardens

TEAM MEMBERS

Architect

The Design Alliance

Civil Engineering and Water Engineering

Civil & Environmental
Consultants

Green Roof Construction

Burns and Scalo

Integrated Design Facilitation, Energy Modeling,

Daylighting Analysis and Materials
7group, LLC

MEP Engineering

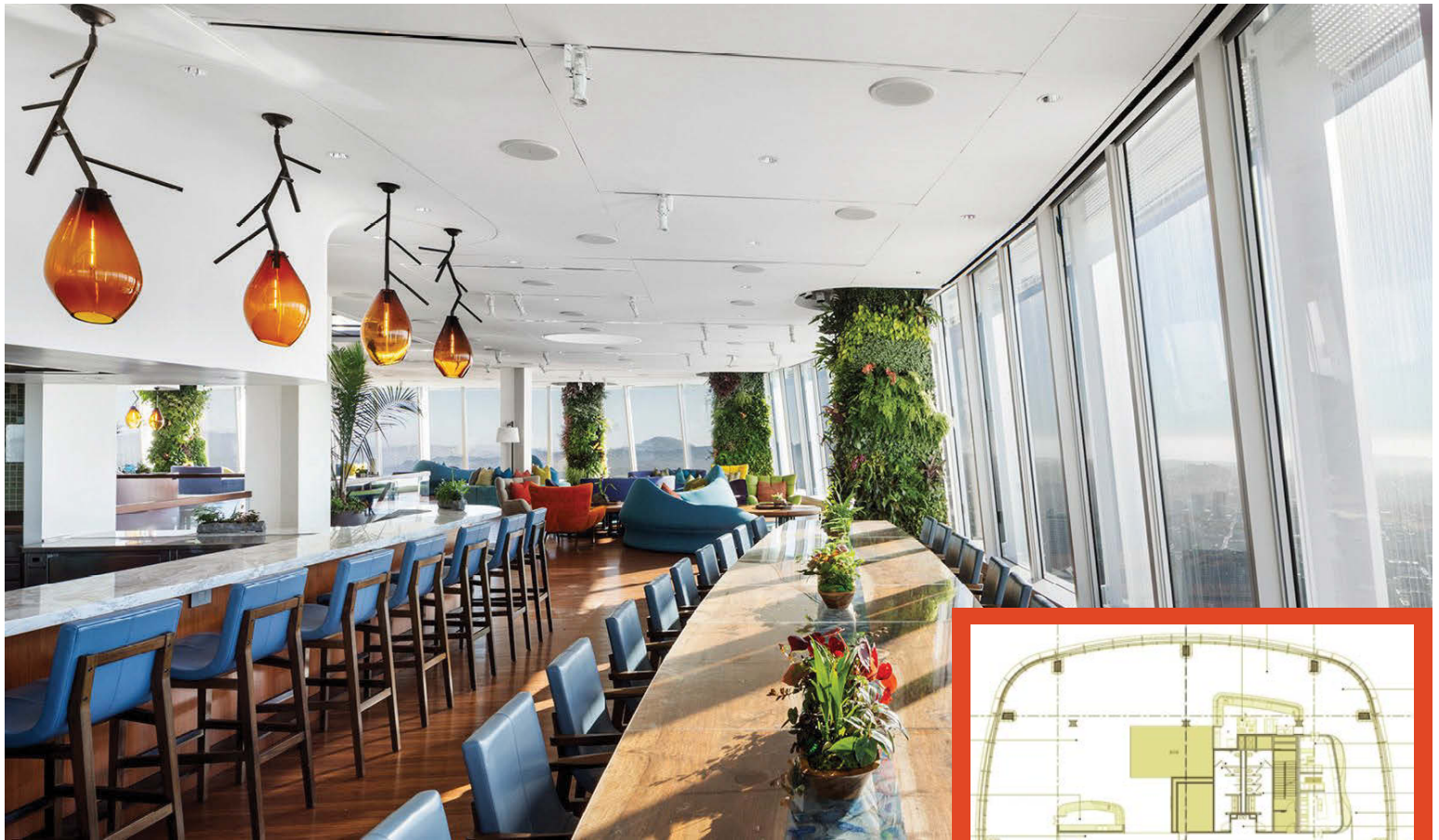
CJL Engineering

Planting Plan, Planting, Maintenance

Phipps Conservatory and
Botanical Gardens

Structural Engineering

Atlantic Engineering Services



A PLANTED OASIS ABOVE SAN FRANCISCO

At 1,070 feet, the Salesforce Tower is the tallest building in San Francisco and host to the Ohana Room, a pinnacle manifestation of workplace design with 360 degree views of the city.

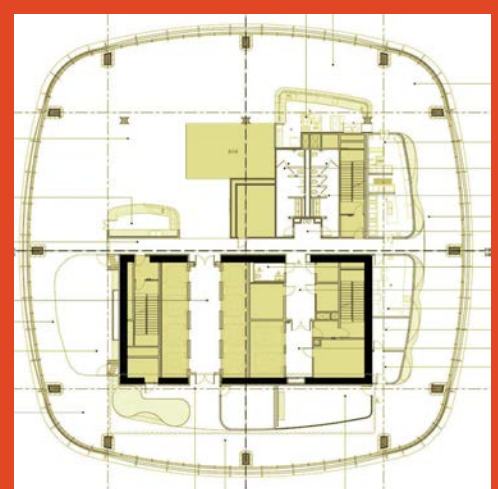
Ohana means ‘intentional family’ in Hawaiian, which encapsulates the room’s intention to promote collaboration, sustainability, fun, and wellness. This included clear sightlines, open flow to allow access to the best sunlight and views, and inspirations from nature.

To bring the intent of the Ohana Room to life, 24 structural columns which surround the circular floor were transformed into colorful and vivid plantscapes. Each column is 13 feet high which required approximately 25,000 plants to cover 3,500 square feet of cylindrical space.

128 plant species were selected to provide colors and textures that would result in a dynamic viewing experience around each of the columns. No two columns are alike: with varying sun exposure, visitors experience changeable hues when observing them from different vantage points. The end result is a tranquil and verdant naturescape set against a sweeping city backdrop and views of the Bay and Pacific Ocean.

Paying homage to the Hawaiian-inspired intention, 48 different varieties of orchids were sourced for rich and delightful pops of color. As a blended space for hosting both community and workforce collaboration, the columns are a source of psychological and literal nourishment: edible herbs such as mint, basil, tarragon and dill were also included for potential use in Salesforce’s kitchens.

Judges praised this project for aesthetics, thoughtful use of green wall technology, and broader community benefits.



CATEGORY
Interior Green Wall

PROJECT
Ohana Floor

LOCATION
San Francisco, CA

AWARD WINNER
Habitat Horticulture

TEAM MEMBERS
Interior Architects
Mark Cavagnero Associates

Lighting Design
Auerbach Glasow

Living Wall Design,
Installation Maintenance
Habitat Horticulture

BIOPHILIC VIEWS FROM A OVER MILE AWAY

The GardenHouse is the first completed project in the US by world-renowned architect Ma Yansong. This modern architectural masterpiece is located in Beverly Hills California within the city center. GardenHouse pays homage to the rich history of Beverly Hills and the iconic mansions of the past. The design of GardenHouse has taken much inspiration from these stately figures, peeking out from behind the manicured green hedges luxurious living. The modern interpretation are these clean line white houses atop floating green rolling hills, which is now the quilted mosaic of a vertical garden. This modern mixed use architectural building covered by the largest living wall in the United States at 6,700 square feet, with 28 species and over 40,000 plants.

The AquaFelt system is comprised of 2 layers of felt, which takes the place of soil over time. The plants roots grow throughout the entire expanse of the wall creating their own vertical ecosystem, which mimics cliffs in nature. This is a form of biophilia that is the key to success of this green wall system. The planted green façade consumes the entire length of the building, encasing windows, balconies and curving at the intersection of 2 major cross streets. The system is hydroponic and recirculates from a large holding tank at the bottom basement floor, pumping water up to the top of the wall and wicked down throughout the felt layers.

Judges praised the project for its scope, scale, and broader benefits to the community in which it was constructed.





CATEGORY

Exterior Green Wall

PROJECT

GardenHouse

LOCATION

Beverly Hills, CA

AWARD WINNER

Seasons Landscaping

TEAM MEMBERS

Architect

MAD Architects

Architect

Gruen Architects

General Contractor

DHC Builders

Living Wall Designer & Builder

Seasons Landscaping



"The financial data learned from the District House Omni Green Roof is pushing the industry forward. We now know in plain dollars and cents the specific value-add that the marketplace puts on a green roof. And it's huge! Quality green roofs increase market value and property value. Period."

- Molly Meyer, Omni Ecosystems

MAKING THE FINANCIAL CASE FOR GREEN ROOFS

District House is a 28-unit luxury condo building located in downtown Oak Park, Illinois, that prioritizes modern, sustainable urban living. The project features several state-of-the-art and ecologically-minded amenities including five private green roof terraces for premium second-floor units.

Installed in 2018, this project includes an integration of native meadow on the upper roof and seeded lawn on the terraces. Overall, the average depth is 6" with a total area of 9,009 square feet. The lush lawn spaces perfectly complement District House's luxury interiors and provide accessible private green space for residents.

The green roof cools the surrounding area, providing a cooler upper rooftop experience for those enjoying the deck surrounded by a native meadow, and cooler terraces where lush private lawns surround condo terraces.

The rooftop features a native meadow mix, designed to create a life support system for a midwestern prairie rich in biodiversity. The green roof incorporates a variety of native plants that provide habitat for local pollinators. With a high level of plant variety and seed mixes designed for healthy ecological succession, the roof is primed to provide opportunities for pollination and food, nesting, nutrients and more for local fauna.

A brief case study was performed to compare sales of units with private green roofs which found that the green roof increased the sales price by an average of almost \$70,000, despite the \$20,000 cost.

Judges praised the project for its use of a self-regenerative nutritive media, and the illustration of the profitability of green infrastructure integrations.

CATEGORY

Multi-Unit Residential

PROJECT

District House

LOCATION

Oak Park, IL

AWARD WINNER

Omni Ecosystems

TEAM MEMBERS

Architect

Northworks

Developer

Ranquist Development Group

Developer

Campbell Coyle Real Estate

General Contractor

MC Construction

Green Roof Installer

Omni Ecosystems

General Contractor

Garanco Construction

Landscape Architect

Dickson Design Studio



“The project site rests on a mountain lake in western North Carolina, a region known for its biologically diverse habitats and species. The green roofs on the buildings integrate the structures into the landscape and are planted with species native to the region and support a wide variety of insects and birds. The plants are arranged in a way that mimics native plant communities with different layers and rooting characteristics.”

- Kate Ancaya, Living Roofs Inc

FOSTERING RESILIENT COMMUNITIES AT ANY SCALE

The design goals for this project were to integrate the buildings into the site and maximize the ecological impact of the green roofs. All of the roofs on the property include a green roof: the main house, guest house, and boathouse. While the main and guest houses each have roofs designed to sustain native plant communities. This was achieved through a rigorous design process that includes a combination of warm and cool-season grasses, perennials, and groundcovers. Aside from being a beautiful amenity, the roofs reduce stormwater, cool the structures, and provide important wildlife and pollinator value.

The green roofs are designed to optimize stormwater retention through the type and components of the green roof build-up, to the plant material, planting approach, and irrigation system. A highly diverse plant species mix was used and a dense planting approach to maximize evapotranspiration and reduce raindrop impact.

Habitat and biodiversity were primary goals for this project and the driving force behind the design, plant selection, planting design, and post-installation maintenance, combining plants with different growth characteristics and habits to maximize plant coverage, habitat, and food and nectar sources. Additionally, the diverse plant palette with large-leafed herbaceous plants also helps to capture particulates in the air.

The green roofs were designed to demonstrate how a natural plant community that supports a diverse range of pollinators can be a beautiful visual amenity.

Judges praised the project for comprehensive utilization of available space for green roofing, and the extensive and thoughtful use of native plantings.

CATEGORY

Small Scale Residential

PROJECT

Sandyland Cove

LOCATION

Lake Toxaway, NC

AWARD WINNER

Living Roofs Inc

TEAM MEMBERS

Architect

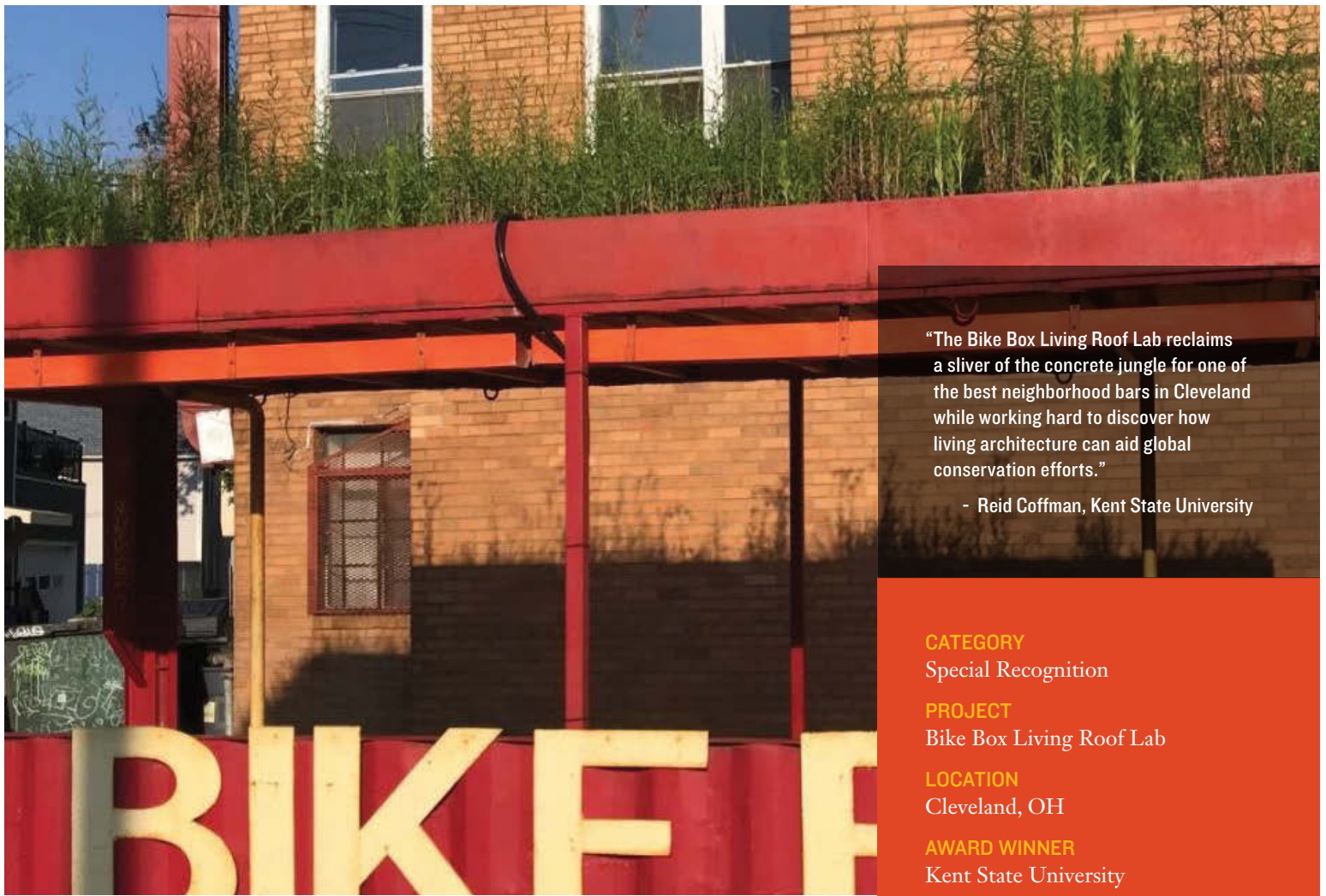
Platt Management Group

General Contractor

Platt Management Group

Green Roof Designer & Installer

Living Roofs Inc



“The Bike Box Living Roof Lab reclaims a sliver of the concrete jungle for one of the best neighborhood bars in Cleveland while working hard to discover how living architecture can aid global conservation efforts.”

- Reid Coffman, Kent State University

CATEGORY

Special Recognition

PROJECT

Bike Box Living Roof Lab

LOCATION

Cleveland, OH

AWARD WINNER

Kent State University

TEAM MEMBERS

Communication Lead

Kent State Student Volunteer –
Leno Esposito

Construction Lead

Kent State Student Volunteer –
Josh Thomas

Design Lead

Kent State Student Volunteer –
Neil Reindell

Drainage Membrane Supplier

The Garland Company

Planner

Land Studio

Project Manager

Kent State Student Volunteer –
Clair Markwardt

Sponsor

Northeast Ohio Sewer District

Volunteer Lead

Kent State Student Volunteer –
Megan Haffl

THE LITTLE GREEN ROOF THAT COULD

The Bike Box Living Roof Lab reclaims a sliver of the concrete jungle for one of the best neighborhood bars in Cleveland while working hard to discover how living architecture can aid global conservation efforts.

Funded by the local sewer district to profile urban green infrastructure, the 149 sf green roof caps a shipping container transformed into a bike shelter for one of Cleveland’s most popular neighborhood corner bars. The Happy Dog is place of community sharing and learning, a tradition the green roof extends.

Situated in the public right-of-way along a new bike lane, the roof softens a very hard urban streetscape. Scruffy native prairie plants provide a resilient display throughout the year while signage tells the story of stormwater runoff to passersby.

The roof operates as a long-term research site for Kent State University, exploring the potential of green roofs to reintroduce endangered or threatened plants. The cultivation of these plants from non-threatened populations in neighboring ecoregions provides a method of sourcing uncommon plants and the success of these species indicates innovation for reintroduction practices in future living architecture collaborations. The roof is the subject of doctoral and master’s study, visited each year by hundreds of professionals and students, and has been a part of national education programs. This small roof has a big impact and is responsible for subsequent collaborative projects involving multiple stakeholders, funding, and market development.

Judges praised the project for its educational outcomes, and relatively large impact for a project of such a small scale.

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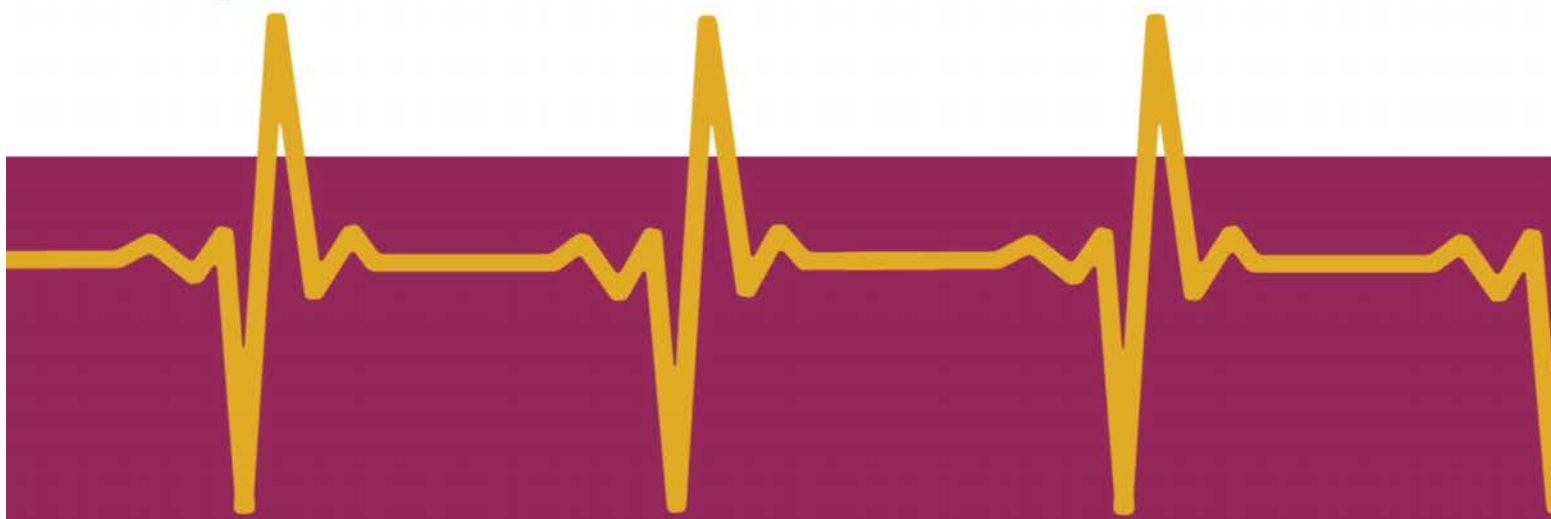
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A GREEN RECOVERY? GREEN INFRASTRUCTURE POLICY GAINING TRACTION WORLDWIDE

BY OLIVER GILLINGS-PECK

The Covid-19 pandemic has put a spotlight on the intrinsic and delicate relationship among health, biodiversity, and consumption patterns which is why policymakers around the world are focusing on a ‘green’ recovery.

We know that part of the reason why highly infectious diseases like Covid-19 arise is an indirect result of too much human interference with the natural world. Deforestation, climate change related disasters, and global wildlife trade all degrade biodiversity, which is why we need policy and action more than ever that enables biodiversity to flourish. Part of recovering ‘green’ from the pandemic means the expansion and maintenance of Green Infrastructure (GI) initiatives as GI stands to bolster biodiversity plus provide a slew of additional benefits.

Over the last six months Canada, the United States, and the European Union (EU) have announced various plans to ensure that GI is part of the ‘green’ recovery. At the beginning of August, the Canadian Government announced the creation of a new Covid-19 resilience stream under the Investing in Canada Infrastructure Program (ICIP). The Covid-19 resilience stream opens up \$3.3 billion in funding which provides provinces and territories with the ability to initiate quick-start short-term projects that otherwise may not have been eligible under the pre Covid-19 ICIP stream. This new Covid-19 resilience stream includes green infrastructure, and features an expedited application process allowing for multiple applications to be submitted at once and a reduction of upfront administrative burdens on provinces and territories so that they can start new projects quickly. The maximum total eligible cost of a single project is capped at \$10 million and will receive a percentage of federal contributions depending on who is applying. Provinces, municipalities and provincial not-for-profit organizations can receive up to 80 per cent federal funding. Territories, Indigenous recipients, municipalities and territorial not-for-profit organizations can receive up to 100 per cent federal funding. For-profit private sector recipients can receive up to 25 per cent in federal funding. A wide variety of infrastructure projects are eligible under this stream providing a great opportunity for new and existing GI projects to be developed.

These changes are the result of advocacy carried out by Green Infrastructure Ontario, a coalition of associations and environmental groups which includes GRHC, working with national organizations.

THE ELIGIBLE INFRASTRUCTURE PROJECTS INCLUDE:

Retrofits, repairs, and upgrades to government owned, health, and indigenous buildings.

Covid-19 response infrastructure i.e. Measures to support social distancing.

Active transportation infrastructure.

Disaster mitigation and adaptation projects.

Check out the 2019 “Social Equity Issue” of the LAM for an article about Green Roof’s application to Disaster mitigation and adaptation.

In late August, I interviewed Luigi Petito, Head of the Secretariat for the EU chapter of the World Green Infrastructure Network (WGIN), a global coalition of GI Associations. I asked him how the EU plans to be a part of the ‘green’ recovery. Petito was excited to share some updates about new GI terminology being inserted into the EU Biodiversity Strategy 2030 as a result of an increasing understanding of the multiple benefits of GI. Indeed, the final draft includes a summary of the benefits associated with investing in GI, including green roofs. “It is incredibly important to raise awareness about the benefits of Green Infrastructure like Green Roofs. Green Roofs are a win-win-win because they provide environmental, social and economic benefits and are needed now more than ever” said Luigi Petito. Members of WGIN EU Chapter, such as Sempergreen, Knauf Insulation, and Optigruen are working together to increase the awareness of green roofs and their important contribution to the EU’s Green Deal.

With the Covid-19 context, the narrative for the Biodiversity Strategy for 2030 and the overall EU Green Deal, which aims at carbon neutrality by 2050, has changed to include language about the importance of building societies’ resilience to future climate change related disasters. This means investing some of the €1.8 trillion Covid-19 recovery funds into developing and



maintaining GI projects. In fact, the European Commission has stated that 30 per cent of the relief funds given to various EU member states must be spent on climate change related projects. Petit suggested that the legislative process of approving the Biodiversity Strategy for 2030 could happen in early 2021 and in parallel, funding for projects will be made available.

Closer to home, in the United States, a congressional bill to establish the Public School Green Roof Project (PSGRP) will likely be reintroduced in the House of Representatives after the upcoming US elections scheduled for November 2020. The PSGRP aims to secure more than \$500 million of funding so that public and secondary schools in low-income areas can install green roofs on their rooftops over the next four years. This would include coverage of technical assessments, installations, and maintenance of green roofs. Included in the funding is \$100 million dollars over a four-year period for maintenance of the rooftops. GRHC's Technical Committee commented on early drafts of the bill which now includes a recognition of Green Roof Professionals and the Living Architecture Performance Tool. The PSGRP is being sponsored by congresswoman Nydia M. Velázquez and is proposed for public and secondary schools where at least 30 per cent of students come from families with incomes below the poverty line. Many organizations like the Natural Resources Defense Council and GRHC have signed onto the bill. Programs like the PSGRP are effective at tackling the well documented and problematic intersection between environmental degradation and poverty by developing GI projects in areas lacking in green spaces. Although the pandemic has taken a toll on the world it has also sparked a global concerted effort for a 'green' recovery, which is an opportunity for governing bodies to go all in on investing in GI.

Oliver Gillings-Peck is in the Masters of Forest Conservation at the University of Toronto, and works as a freelance journalist. Works Cited:

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CRADLE TO CRADLE CERTIFIED GREEN WALLS CONTRIBUTE TO HEALTHY AND CIRCULAR BUILDING

BY JELENA SCHELTEMA, SEMPERGREEN GROUP

Earlier this year, Sempergreen received the Cradle to Cradle Bronze certificate for its living wall systems: SemperGreenwall Indoor, Outdoor and CompactLine. This certificate emphasizes the fact that vertical gardens can contribute to sustainable, healthy and circular building.

THE PRINCIPLES OF CRADLE TO CRADLE

Cradle to Cradle (C2C) is a design philosophy developed by Michael Braungart and William McDonough, based on the principle that waste equals food. All raw materials and materials used must be fully and indefinitely reusable or environmentally neutral without losing their value. Companies that follow this principle when creating their products, are eligible for Cradle to Cradle Certification.

The Cradle to Cradle Certificate is an international certification for raw materials and products that can be fully reused in a way that preserves or even increases their value. This can be realized by reusing parts for new products, or in the form of biodegradability, which provides nutrients to nature. The composition of the materials is therefore extremely important, as is their origin.

HOW TO OBTAIN A CRADLE TO CRADLE BRONZE CERTIFICATION

There are five levels of certification that products can achieve: basic, bronze, silver, gold, and platinum. To obtain a Cradle to Cradle Bronze certification products, need to adhere to several requirements. Here is a selection of the requirements that SemperGreenwalls had to meet within the categories Material Health and Reutilization, Renewable Energy & Carbon Management, Water Stewardship and Social Fairness:

- The SemperGreenwalls are at least 75 per cent assessed (by weight) using ABC-X ratings.
- The products have a Material Reutilization Score that is at least over 35.
- Sempergreen has developed a renewable energy use and carbon management strategy for the production process.
- The company has completed a facility-wide water audit for the production process.
- Sempergreen has completed a full social responsibility self-audit and developed a positive impact strategy.

To meet these requirements, Sempergreen teamed up with certified consultants from Bilfinger Tebodin, an international consultancy and engineering company.

CRADLE TO CRADLE PROCESS DOES NOT STOP AFTER OBTAINING THE CERTIFICATE

Obtaining the bronze Cradle to Cradle certificate for the SemperGreenwall is not an end in itself. Recertification takes place every two years. During the recertification, it is important that it can be demonstrated that the plan presented during the certification process is actually implemented and that progress is being made. Within the philosophy of Cradle to Cradle, Sempergreen therefore continuously works on developing and improving the product based on the aforementioned criteria, with the aim of progressing to a silver certification.

WHY SEMPERGREEN DECIDED TO TRY FOR A C2C CERTIFICATE

If it is such a hassle, why even try to obtain a Cradle to Cradle certificate? It is Sempergreen's mission to contribute to creating a green and livable world, while keeping the ecological footprint as small as possible. Its employees work with respect for each other and for nature. One of Sempergreen's core values is to take responsibility and to continuously improve the sustainability of the green solutions and internal processes, while always taking people, animals and the environment as a starting point. The Cradle to Cradle certification for the entire SemperGreen-wall system fits well within this philosophy.

GAIN LEED AND BREEAM SCORES WITH C2C CERTIFIED PRODUCTS

It also brings Sempergreen, building owners, (landscape) architects, contractors and gardeners with similar philosophies together to achieve a single goal: sustainable, healthy and

circular building. A way to gauge the sustainability of a project are LEED (and BREEAM) scores. Cradle to Cradle certified products can make a significant contribution to earning points under the LEED v4 green building rating system.

By choosing Cradle to Cradle certified products, projects can earn up to two points in the Materials & Resources category Credit 4, Building Disclosure and Optimization - Material Ingredients. Cradle to Cradle certificates are currently directly used as proof for one criterion. For many other criteria, the positive properties and available data from the certification of the certified product help achieve this.

Sempergreen is a worldwide company that wants to improve the quality of life through innovations in sustainable construction and greenery in the city. Worldwide, the company supplies quality products for living walls, green roofs and ready-to-lay ground covering. <https://www.sempergreen.com/>



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Photo courtesy Brooklyn Grange Rooftop Farm

BROOKLYN GRANGE ADAPTS TO THE CHALLENGES OF THE COVID 19 PANDEMIC

BY BEN FLANNER, CEO, BROOKLYN GRANGE

As a ten-year-old and fairly unique rooftop farm business, Brooklyn Grange has a balanced diversification of revenue streams: vegetables, dinners and events, green roof construction, and garden maintenance (not to mention consulting, tours, workshops, film shoots, hot sauce, and honey). Yet, within a few days of New York State Governor Cuomo's Pause Order, nearly every one of those revenue streams went from healthy, to completely dried up.

In response, we started modeling out cash flows, counting out weeks of payroll, guessing re-opening dates, how it would all look, whether events could even happen in 2020, considering layoffs, rent negotiations - you name it.

Difficult questions quickly arose, even as an essential business. People still have to eat, right? But should farmers be out there each day to keep the farms on track for the season? Are they safe? Even with nearly an acre of rooftop per farm manager, our farmers still had to travel to work, ride elevators, face multiple points of potential exposure, while many New Yorkers had safely quarantined at home, or left town altogether.

Determined to feed their community, our team chose to stick it out, so we made

major pivots amidst all of the uncertainty. We nearly tripled CSA enrollment with a hard marketing push, and put together creative funding to re-allocate nearly 20 per cent of our vegetables to pantries and non profit organizations that are feeding the hungry. By the summer, all four farm stands opened.

Meanwhile, many of the big green roof installations we'd booked for 2020, financially critical to the business, were delayed indefinitely. Landscape maintenance was always deemed as essential, and though it slowed, it never quite stopped. Construction has now reopened for outdoor spaces and green roofing, and we've been able to accomplish some of our major projects - enough to keep us going. Our events, equally critical, have just begun to restart, in the form of very small, distanced groups. Sadly, though, most were canceled this year.

In business philosophy, diversification of revenue streams creates complexity, but that same diversification is also supposed to protect from unexpected changes and catastrophes. And, as the dust settled, our multiple channels of business started to show their value. One thing was up, while another thing was down. People were eating at home, just not at restaurants. Our landscape designs maximizing outdoor space, embracing our city's biophilia, and prioritizing green

roofs sure seem wise right now. And, the few events that are taking place are eager for safe outdoor breeze!

These trying times have also provided opportunities to look closer at ourselves and at our operations. We've been able to better appreciate the value of our connectedness and our community once we were isolated. We've experienced both the honor, and the pressure, of being essential food workers amidst a pandemic. We've opened our eyes further to the injustice of how our society values critical labor, and ways those injustices permeate our own business, particularly amongst essential work, and even in a city

with a relatively high minimum wage of \$15/hr. The murder of George Floyd was the final tipping point for many, and the resulting anger and uprisings across the nation and world, brought further attention to racist policies in our society which influence all of these issues.

2020 has brought unprecedented challenges. And with challenges come opportunities to rise up and do better. We've learned a lot in 2020, and we look forward to what 2021 brings.

Ben Flanner is the Co-founder, CEO of Brooklyn Grange, which operates three rooftop farms in New York City.

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Volume 7 Number 1

GREEN ROOF RESEARCH IN NORTH AMERICA: A RECENT HISTORY AND FUTURE STRATEGIES

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Regional Centers of Excellence (RACE) in Living Architecture
Green Roofs for Healthy Cities and Green Infrastructure Foundation

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Since the year 2000, green roof and living architecture research has progressed significantly in North America. For future growth in the implementation of living architecture, there is still a great need for additional and expanded research on green roofs and as yet undefined innovative green infrastructure. This paper provides an overview of priority topics that have been critical to past success in green roofs, and those that are promising but need future investment, including urban heat island (UHI), energy savings, stormwater (quantity and quality), substrates, carbon budgets, plants, biodiversity, ecomimicry, biodispersal, long-term dynamics, urban food production, synergy with solar panels and financing green solutions.

Keywords: Living Architecture, Green Roof, Green Infrastructure, UHI, Substrate, Stormwater, Carbon Budgets, Biodiversity, Ecomimicry



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WIND UPLIFT ON GREEN ROOFING – IS IT OVERBLOWN?

BY LIZ MORRIS, GRP

After several decades of experience in North America, green roof designers, suppliers and installers have spent a lot of time perfecting their trade. The industry has learned a great deal about how to install vegetated roofing that is thriving, leak-free, and long-term (as in, lasting for many decades).

As the world of living architecture continues to mature, we are now expanding into new realms never thought possible. For example, the University of Miami is in the middle of a hurricane super-highway. Until recently, not much green roofing happened in hurricane zones, due to concerns about keeping green roofs on buildings during very high winds. But this campus's 25 new green roofs were accepted by Miami-Dade for high velocity hurricane zone wind resistance, and are the new standard for protection against wind uplift.

Considering that hurricane zones are generally located in highly sensitive coastal environments, it is especially important that we are able to utilize the most impactful aspect of sustainable urban development in these areas – which is the reintroduction of vegetation through living architecture. These fragile watershed ecosystems can benefit significantly from on-structure vegetation, especially due to improved stormwater management, reduced urban heat island effect, and enhanced air quality.

It's not just hurricane zones that call for withstanding strong winds. Non-coastal cities located on fresh waters also can experience damaging gusts through lake- and canyon-effects. High-rise green roofing on skyscrapers in any wind zone must consider the potential for displacement of the green roof components in strong winds.

So how to design in hurricane zones? It is important (even without on-structure vegetation) to get a comprehensive under-

standing of the wind conditions on site. Whether caused by other buildings, high-rise conditions, or location in a hurricane zone, the first step is knowing the various wind-uplift scenarios each roof area will experience.

The next step is ensuring the system configuration can withstand the rooftop conditions without displacement of any components. Generally, the edges of the roof are most sensitive to wind uplift, but can be secured with the use of vegetated free zones of strapped or otherwise secured pavers. Or, in the case of the University of Miami Lakeside Village housing, their green roofs have a double parapet wall, which left a non-vegetated wind tunnel around the perimeter of each roof, to channel the wind away from the greenery.

Another consideration is the use of insulation and drainboards, both of which could introduce the potential for uplift if not sufficiently ballasted and secured. The use of soil stabilizers, such as several layers of mesh within and on top of the growing media, can help keep it in place during high winds. But planting is also key to protection against wind scour - thriving roofs with full coverage of vegetation will hold their growth media in place more effectively than sparse, unhealthy plantings.

As green roofs and living walls become increasingly commonplace, and the benefits clearer and increasingly measurable, we can now begin to expand into hurricane zones, urban high-rise conditions, and cities with strong lake effects – which happen to be areas that can most benefit from living architecture.

Liz Hart Morris, CDT, GRP, Director of Green Roofing, Henry serves on the board of GRHC and has recently published a course on Why Green Roofs Fail and What to Do About it on the Living Architecture Academy.



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