LIVING ARCHITECTURE MONITOR®

A GREEN ROOFS FOR HEALTHY CITIES PUBLICATION

VOLUME 16 / ISSUE 1 / SPRING 2014

REVITALIZATION ISSUE

Green Roof Gets an Urban Agriculture Facelift

Confessions of a Green 'Starchitect'—Emilio Ambasz

Living Architecture Community Revitalization Projects

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VOLUME 16
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INSIDE

ON THE COVER: Park or building? Award-winning architect Emilio Ambasz's Fukuoka building in Japan.
Image provided by: Hiromi Watanbe

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REVITALIZING OUR COMMUNITIES THROUGH LIVING ARCHITECTURE

"UNEMPLOYMENT IS CAPITALISM'S WAY OF GETTING YOU TO PLANT A GARDEN."

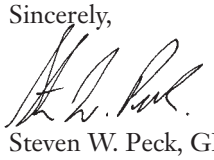
Orson Scott Card

Despite what Orson thinks, building thousands of new 21st century 'gardens' on walls and roofs may in fact just be the remedy needed to address the challenge of local job creation. In this period of global capitalism, when our workers have to compete with cheap foreign labor and low or non-existent regulations safeguarding the environment and workers, several strategies for community revitalization through job creation stand out. One strategy involves identifying and investing in things that cannot be easily outsourced to cheap labor markets and that are labor intensive. Living architecture like green roofs and walls is sourced locally or regionally, and maintained with local labor. For each dollar spent on a green roof, between 75 to 85 cents results in direct or indirect employment.

Another strategy, called import substitution, is to invest in projects that replace imports from markets outside the community. Green roofs and walls can save energy and water, improve human health and produce useable products such as food, all of which are generally imported. Green roofs and walls are an import substitution strategy and are labor intensive, locally sourced infrastructure. In addition to jobs, they also bring additional revitalization benefits associated with providing opportunities for community development and cohesion, improving social justice, storm-water management, air quality improvement, better aesthetics, active and passive recreation opportunities and education.

Our collective goal, as an industry, is to implement 1 billion square feet (sf) of green roofs and thousands of green walls by 2022 – our 20th anniversary. We can't do this without more public policy and investment in green roof and wall technologies. At *Grey to Green* in Toronto, August 25-26, we will explore the health benefits of green roofs and walls. The new LAM Index (right) provides a statistical snap shot of how investing in living architecture in our communities may contribute significantly to their revitalization.

Sincerely,



Steven W. Peck, GRP
Founder & President, GRHC

THE LAM INDEX: REVITALIZATION

19.8 MILLION SF
Estimated area of green roofs completed in 2012 across North America

1.3 MILLION SF
Green roof area installed in 2012 in Washington DC

48.5 BILLION SF
Potential green roofable area on buildings in communities over 50,000 in population throughout the U.S.

6 HOURS
Extensive green roof maintenance employment generated per 1,000 sf per year

190 THOUSAND
Jobs generated from covering only 1 percent of the green roofable area in medium to large urban centers in the U.S.

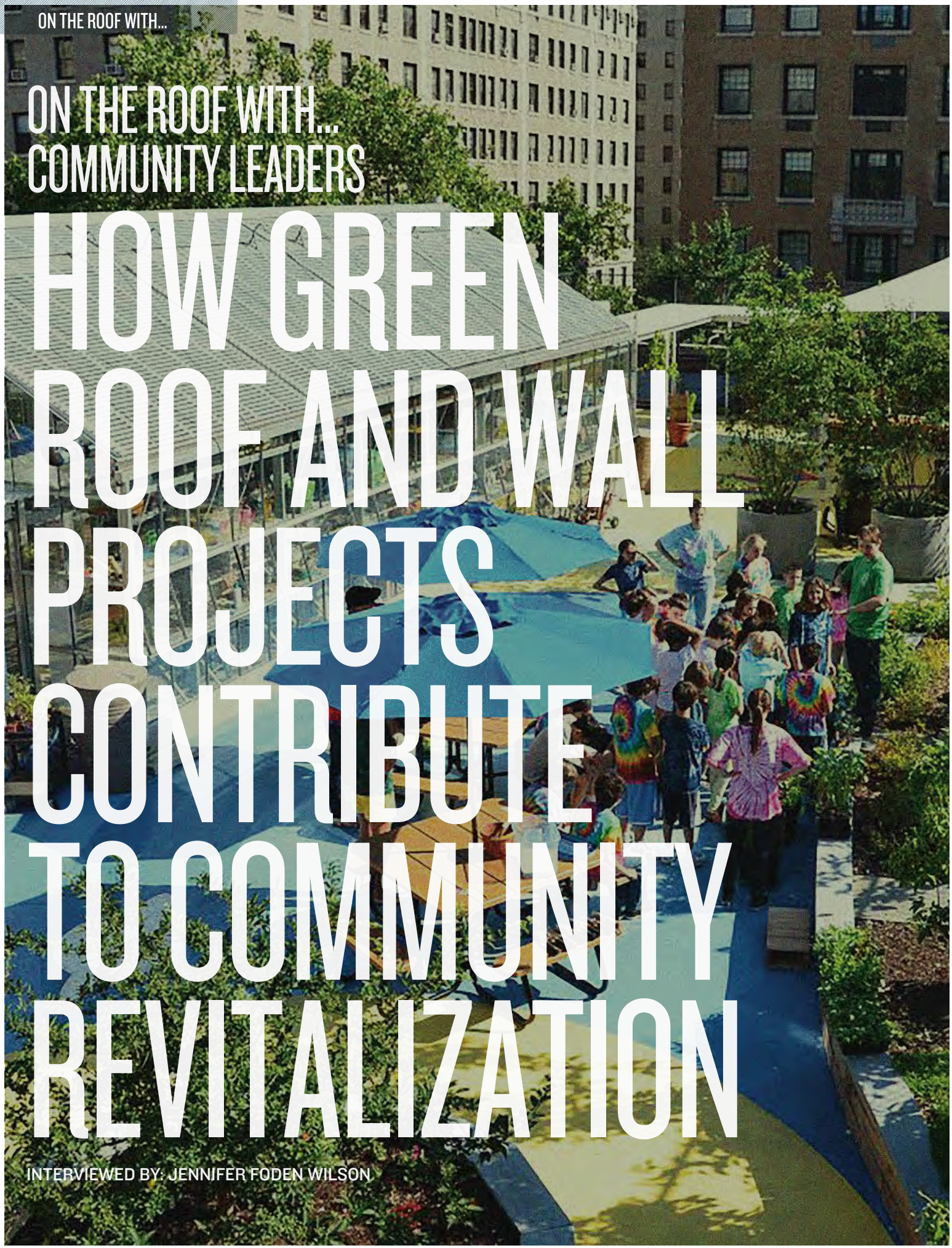
40 THOUSAND LBS.
Annual yield from Brooklyn Grange's 43,000 sf rooftop farm

10 PERCENT
Of employee absences attributed to no connection with nature

9.6 BILLION
Estimated cost of covering 1 percent of green roofable area in U.S.

90.3%, 8.9% AND 0.8%
Corporate office space dedicated to salaries, rent/ mortgage and energy respectively

For a full list of sources, visit: http://goo.gl/jwNX6.



ON THE ROOF WITH... COMMUNITY LEADERS

HOW GREEN ROOF AND WALL PROJECTS CONTRIBUTE TO COMMUNITY REVITALIZATION

INTERVIEWED BY: JENNIFER FODEN WILSON

In this issue of the *Living Architecture Monitor*, we wanted to explore how green infrastructure contributes to community revitalization. So, we spoke to four community leaders championing their neighbourhood's community center, affordable housing building, health center and school—and found out how their green roof and wall projects helped impart new life into their neighborhoods.

PROJECT	PROJECT	PROJECT	PROJECT
McCabe Park Community Center (2,000 sf green roof)	Arbor House (10,000 sf rooftop farm and 168 sf living wall)	AccessPoint on Danforth (6,426 sf green roof)	Eric Dutt Eco Center at the Lillie Devereaux Blake School (5,000 sf green roof)
Nashville, Tennessee	New York, New York	Toronto, Ontario	New York, New York
Tim Netsch, assistant director, Nashville Metropolitan Board of Parks & Recreation	**Richard J. Brackett,** vice president, Sky Vegetables	**Lara Mrosovsky,** health promoter, AccessPoint on Danforth	**Mark Morrison, GRP,** president, Mark K. Morrison Landscape Architecture PC
Completed 2010	Completed 2013	Completed 2010, garden established in 2011	Completed 2011

HOW HAS THIS PROJECT REVITALIZED THE SURROUNDING NEIGHBORHOOD?

TIM: The community center is the new centerpiece of a well-used community park that also includes a golf course, three baseball fields, a playground and the Richland Creek Greenway. The surrounding neighborhood is a vibrant Nashville streetcar suburb. The new programs, events and services provided by the community center are part of the daily lives of surrounding residents. Proximity to the park and center are regularly highlighted in real estate ads. The visitors generated by the park and center also generate customers for nearby shops and restaurants.

RICHARD: Arbor House is a 120,000 square foot (sf), eight-story, 124-unit affordable housing building that opened in February 2013 in the Forest Houses complex in the Bronx (originally built in 1956). The LEED Platinum, state-of-the-art building was constructed using local and recycled materials wherever possible. It features a Sky Vegetables hydroponic rooftop farm and a living green wall in the lobby.

OPPOSITE: ERIC DUTT ECO CENTER AT THE LILLIE DEVEREAUX BLAKE SCHOOL GREEN ROOF IN NEW YORK CITY

Image provided by: Mark Morrison

TOP LEFT: RICHARD BRACKETT
Image provided by: Sky Vegetables

BOTTOM LEFT: TIM NETSCH
Image provided by: Tim Netsch

RIGHT: LARA MROSOVSKY
Image provided by: Sara Shettleworth Mrosovsky

OPPOSITE: MARK MORRISON
Image provided by: Steven Peck

It has been a significant step in urban renewal.

LARA: In the fall of 2010, AccessPoint on Danforth opened its doors. The building was purpose-renovated to house a hub of community services and programs. Multiple partner agencies are tenants in the building and Access Alliance Multicultural Health & Community Services is the lead partner. There is health clinic downstairs as well as settlement services and a range of community programs geared towards improving the health of the neighborhood and of immigrants and refugees across the GTA.

MARK: This is a public school in a fairly upscale neighborhood. So when you speak of revitalization, I feel that the term needs to be understood in the context of the upper east side of Manhattan. Adding this green roof to a public school—and thereby improving the quality of education in that school in an area in which many families send their children to private schools—encourages economic diversity in the neighborhood. This is culturally and socially revitalizing.

HOW HAS THE GREEN ROOF AND/OR WALL CONTRIBUTED TO THIS REVITALIZATION?

TIM: Metro Parks and

surrounding residents take pride in the community center's sustainable features. The building is LEED Silver certified. While some very important sustainable features aren't necessarily visible, the green roof makes a high profile, beautiful statement about our commitment to sustainability. Because the center is located in the Richland Creek watershed, an impaired waterway, our approach to stormwater treatment was an especially high priority. Along with other strategies, the partially accessible green roof helped us achieve our goals.

RICHARD: The green wall serves as a welcome to the residents of the building, and the rooftop farm serves as a beacon to the neighborhood at large. In addition to providing fresh, local, chemical-free produce, the farm has provided jobs to residents of the complex and neighborhood. We also provide educational tours to schools in the area and are working on a curriculum with a neighboring school. We also work through the community center to distribute food to residents, as well as educate them with the assistance of a nutritionist.

LARA: The green roof is an oasis, a peaceful getaway from a busy intersection and a high-rise area where residents, for the most part, don't have access to private outdoor space (other than balconies). It's also a teaching space where people collaborate together to grow food. Socializing and community building happen in the rooftop garden through gardening, volunteer groups, events and workshops.

MARK: The environmental awareness that is passed on to the students and to the parents will, over time, have an overall greening effect on the neighborhood. While it is debatable whether this neighborhood requires economic revitalization, this heavily urbanized neighborhood certainly benefits from enhanced open spaces.

CAN YOU TALK A BIT ABOUT THE ECONOMIC BENEFITS OF THIS GREEN ROOF OR WALL PROJECT?

TIM: Only anecdotally, so don't quote me here. If the center was not LEED certified, community enthusiasm or pride would not be as high, which may impact surrounding property values.

TOP: ARBOR HOUSE LIVING WALL IN NEW YORK CITY
Image provided by: Bernstein Associates

BOTTOM LEFT: MCCABE PARK COMMUNITY CENTER GREEN ROOF IN NASHVILLE
Image provided by: Andy Sudbrock

BOTTOM RIGHT: HOT PEPPERS ON THE ACCESSPOINT ON DANFORTH GREEN ROOF IN TORONTO
Image provided by: Sara Shettleworth Mrosovsky

RICHARD: In addition to the construction and development jobs that were part of the initial project, the farm has created a micro-economy, where we grow, sell and employ in a relatively small area. Supplies are sourced locally whenever possible.

LARA: With the installation of the green roof, there have been cost savings for the facility. For example, heating/cooling costs are reduced by the layer of insulation provided by the roof garden; and energy use for heating water is reduced by the passive solar water collector. It pays off in the long run not just economically but ecologically. Especially considering the city's worsening air quality and ever-rising population density. With the establishment of food gardens on the AccessPoint rooftop, economic benefits also come from cost savings on food.

MARK: This project has effectively expanded the usable space of the school, without causing them to expand their footprint, by creating an outdoor lab, classroom and meeting space for the teachers and students on a space that would have otherwise been vacant. In addition, it lowers heating costs for the building. The wind turbine provides supplemental electricity to the school, which lowers their operating costs.

CAN YOU TALK A BIT ABOUT THE SOCIAL AND HEALTH BENEFITS OF THIS GREEN ROOF OR WALL PROJECT?

RICHARD: The social and health benefits are what we champion as our core responsibilities. Our mission is to provide a year-round supply of fresh, chemical-free, nutritious produce to a population that is traditionally grossly underserved.

MARK: Most schools enjoy outdoor activities through organized sports or in playgrounds. The garden and classroom, and turtle pond, offer a different kind of physical experience. Students learn to observe changes over time, about teamwork and patience and how to reap the rewards of their gardening labor. And, most obviously, food security will be enhanced by teaching students how to grow food. There are good reasons for the abundance of school garden programs worldwide; educational garden programs teach students about science, nutrition, climate change, as well as the politics of food.

WHAT WERE SOME OF THE CHALLENGES OF INTEGRATING THIS GREEN ROOF OR WALL INTO THE COMMUNITY?

TIM: The roof has been enthusiastically embraced by the community since day one.

RICHARD: There were structural challenges with regard to seismic weight load (overall weight load for the greenhouse is less than snow load) due to wind. We needed handicap access for staff, fire sprinklers for the roof, utilities and water taken up one more story. The greenhouse captures rainwater which is stored in a cistern below the building. It is filtered; UV treated and pumped back up. Eliminating rainwater runoff and dramatically reducing our need for municipal water. There were zoning obstacles that needed to be overcome. Yet, every step of the way we were met with encouragement and support for what we were trying to accomplish.

MARK: Funding was an issue; a very active parent group privately fundraised and interfaced with the city. Most importantly— and this has affected green roof and urban agriculture projects citywide— in February of 2010, former Mayor Michael Bloomberg released a set of recommendations called Zone Green to alter existing NYC regulations. Subsequently the zoning text amendment now allow roof structures, such as green walls and greenhouses, to be 25 feet taller than previous zoning regulations permitted.

LARA: The garden design has been changeable due to the collaborative nature of the effort. Also, it took time to raise awareness of the rooftop garden. It's really the participation that has made this rooftop integrated in the community.

Jennifer Foden Wilson is the editor of the Living Architecture Monitor *magazine.*

FIND OUT MORE

For more photos and to see the teams who worked on these projects, visit: http://goo.gl/jwNX6.

NYC'S GREEN PAST, PRESENT AND FUTURE

KEY CHANGES AND ONGOING CONSIDERATIONS FOR NEW YORK CITY'S GREEN ROOF TAX ABATEMENT PROGRAM

BY: ROB CRAUDERUEFF

New York City's sewer system was originally designed to combine stormwater runoff with raw sewage. And there was a time (not too long ago) when the City only promoted hard infrastructure such as concrete pipes and water holding tanks to manage combined sewer overflows (CSOs). However, with organizations such as Stormwater Infrastructure Matters (S.W.I.M.) pushing green policy forward in New York City, times have changed.

In 2007, the S.W.I.M. coalition organized green roof professionals, policy makers, environmental justice organizations and environmental organizations to develop a shared vision for a Green Roof Tax Abatement program in New York City. Due to this coalition building, as well as significant research, analysis and work with elected officials, the NYC Green Roof Tax Abatement was originally passed in June 2008. Although the value ($4.50/sf) supported by the Bloomberg administration was lower than the value recommended ($6.75/sf), the coalition supported this incentive to gain political traction with the City.

PROGRAM REVIEW

The 2013 extension and improvement of the New York City Green Roof Tax Abatement resulted from the coalition's follow-up research and partnerships with public agencies. I conducted an independent analysis with land use attorney Caroline Harris on behalf of S.W.I.M., which included interviews and focus groups with green roof contractors. This research articulated administrative and financial barriers that limited participation in the tax abatement program. Administrative barriers included a lengthy review process (at times requiring more than 100 hours by the contractor). Economic barriers included a need to increase the value of the Green Roof Tax Abatement, and to allow the tax abatement to be amortized over multiple years.

KEY CHANGES

The law, enacted in December 2013, puts forward the following key changes to the tax abatement program:

1) The duration of the tax abatement has been extended by five years, from 2014 to 2018.

S.W.I.M.'s success includes encouraging the development of NYC's Green Infrastructure Plan, a $187 million commitment to green infrastructure over the next several years and more than $1 billion over the next several decades. The objective of this program is to reduce the volume of CSOs, through a legally-binding agreement to meet federal *Clean Water Act* requirements.

2) The value of the tax abatement has been increased—doubling the per-project cap to $200,000, and increasing the per square foot (sf) value to $5.23.

3) Native plantings and urban agriculture are allowed in the law, in addition to sedum plantings.

4) The NYC Department of Environmental Protection has dedicated a point person to ensure the tax abatement is utilized, helping to reduce bureaucratic challenges.

ONGOING CONSIDERATIONS

Despite the legislative success, three key areas need to be addressed for implementation. First, the City needs to clarify its financial administration of the program. In the most recent legislation, the City placed a cap on the amount it may spend in a given year on the abatement program: $750,000 for the 2014 application cycle and $1 million each year from 2016 through 2018. The City's Department of Finance (DOF) needs to establish a fair process to award the abatement to applicants, in the event the value of all eligible applications exceeds the City's program budget. Similarly, DOF needs to establish a clear policy for amortizing the tax abatement across multiple years, in the event the abatement value exceeds an applicant's annual property tax liability.

Second, the City needs to ensure policies for acquiring the tax abatement are clearly stated in the rules guiding the implementation of the law. In particular, we have recommended that the City extend the amount of time required for plants to reach 80 percent coverage of the green roof from one year to two years. And third, there is the ongoing question of whether the value of the tax abatement is sufficient to encourage private investment in green roofs. The current per sf value of $5.23/sf is not substantially higher than the prior value ($4.50/sf, with a $100,000 cap), and significantly less than the $9.00 to $14.00 per sf range recommended by S.W.I.M. in 2013. The City should pair applicants with additional incentives, such as the NYC DEP Green Infrastructure Grant Program. This may be particularly important for smaller projects that are more expensive per sf.

Rob Crauderueff is president of Crauderueff & Associates (crauderueffassociates.com) and the coordinator of the S.W.I.M. coalition. He is also a former GRHC Civic Award of Excellence winner.

FIND OUT MORE

Stormwater Infrastructure Matters: swimmablenyc.info

NYC Green Roof Tax Abatement program: http://goo.gl/2id4mU

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For questions about joining the editorial review board, submitting manuscripts or policies and procedures, contact editor, Jennifer Foden Wilson, jfodenwilson@greenroofs.org or 416-971-4494 ext. 231.

JOURNAL OF LIVING ARCHITECTURE

The Journal of Living Architecture (JOLA) is the official, peer-reviewed journal of Green Roofs for Healthy Cities, an interdisciplinary trade and professional organization, linking research, design and policy with the industry; and is dedicated to advancing the methods and practices of creating living architecture for healthier cities. The JOLA's mission is to expand and update the research and knowledge base for living architecture and allied professionals. In addition, the JOLA serves as a forum for emerging and contemporary issues affecting living architecture.

The JOLA is written, reviewed, and edited by living architecture research professionals, sharing with their colleagues: successful educational applications, original research findings, scholarly opinions, educational resources and challenges on issues of critical importance to living architecture professionals and educators.

The JOLA is published exclusively on the *Living Architecture Monitor* magazine website. The magazine will publish the abstract of each published JOLA manuscript, with a link to the full paper online.

ISSUE NO.2

FEATURE

NATIVE FORBS PRODUCE HIGH QUALITY SEEDS ON CHICAGO GREEN ROOFS

K. Ksiazek, J. Fant and K. Skogen

Although a paucity of bees on Chicago green roofs suggests some plants may experience reduced pollination and thus poor seed production, a previous investigation revealed high seed set in green roof plants. However, high quantity of seeds does not always imply high quality. In this study, we compared seed germination between green roof and ground-level locations. We hypothesized that forb seeds from green roofs would have lower germination due to differences in maternal provisioning and environmental stressors. We found that green roof seeds did not have lower germination; this supports the continued use of native forbs on green roofs.

			Ground		Roof	
Species	Days in cold stratification	Germination ratio (ground to roof)	Days to 50%	Days to 100%	Days to 50%	Days to 100%
A. cernuum	56	1.00:1.03	5	14	4	10
A. canescens	16	1.00:1.01	3	21	3	21
A. canadensis	52	1.00:1.00	17	37	14	37
A. tuberosa	31	1.25:1.00	5	7	5	7
B. alba	15	1.00:0.00	7	25	N/A	N/A
B. australis	15	1.00:1.17	7	17	10	17
D. purpurea	0	1.00:1.83	4	17	4	21
M. fistulosa	31	1.00:1.04	5	13	5	13
P. digitalis	0	1.00:1.35	11	25	10	29
Z. aurea	57	1.00:1.24	6	14	8	17
Mean		**1.00:1.04**	7	**19**	7	**19**

IDEAS AT WORK

AESTHETICS FOR GREEN ROOFS AND GREEN WALLS

R. Sutton

Do green roofs and green walls have aesthetic benefits? Most green roof proponents would say so. But what are they and how do they relate to green roof design in terms of species selection, planting arrangement, viewable context, access, maintenance and other factors? Aesthetics according to the Green Roof Design 101 Manual 2nd Ed provides "pleasure- and psycho-physiologically-oriented benefits" but, this narrow understanding suggests that the aesthetic potential of green roofs is limited to what one might experience looking upon any garden. We suggest other ways that need exploring to make aesthetics more relevant and understandable to the practice of wall and roof greening.

READ THE ENTIRE PAPERS HERE:

http://goo.gl/o1bk54

See what green roof and wall research was published in other journals from November 2013 to January 2014: http://goo.gl/jwNX6.

GREEN ROOF LEADERSHIP

Image provided by: AD Greenroof LLC

ANGIE DURHMAN, GRP, MS

PRINCIPAL & OWNER, AD GREENROOF LLC, MINNEAPOLIS, MN

When did you become a GRP (green roof professional)?: 2009

Were your career ambitions always environmentally driven?: Yes, I love applying my botanical and ecological knowledge in the built environment. My career allows for creativity and applying science for real world challenges. Recently AD Greenroof installed a research station to collect data on the performance of an intensive roof in St Paul, MN. We saw it as an unconventional approach to work on the project, but our results will be impactful for the community and will support future policy development.

What are some of the projects you've worked on since becoming a GRP?: Aside from completing over 300 installs, I most enjoy improving failing systems and maintaining healthy ones! Maintenance often gets left behind, so my company is working hard to create a budget friendly management system designed for building owners and contractors that will work for any green roof project.

How has your experience as a GRP impacted your business or work?: The designation brings more awareness and clout to our industry, which is important when speaking to professionals in other industries and government officials who are unaware of the progress we've made in the last fifteen years.

What is your vision for the living architecture industry throughout the next decade?: I would love to see green roofs as a viable and economic option written into every stormwater plan across the country. We are slowly working towards that goal, making unique partnerships at the local level.

Image provided by: Higher Ground Green Roofs LLC

MEGAN (WELSH) MEIER, GRP, LEED GA

OWNER, HIGHER GROUND GREEN ROOFS, LLC, COLUMBUS, OH

When did you become a GRP (green roof professional)?: 2009

Were your career ambitions always environmentally driven?: After working on a documentary about climate change and the impact of the built environment, I made a career change from film editing to sustainable construction and green roofing. Since there were no green roof programs at Ohio State University at the time, I studied construction management and horticulture with the intent of propelling green roofs in Ohio.

What are some of the projects you've worked on since becoming a GRP?: Ohio State University green roof at Howlett Hall, Battelle Darby Creek Nature Center, Washington DC National Zoo, Mercy West Hospital and Akron University.

How has your experience as a GRP impacted your business or work?: As one of only six GRPs in Ohio, I have the responsibility of educating my region on green roof technologies, advancements, maintenance requirements and best management practices.

What is your vision for the living architecture industry throughout the next decade?: With the diminishment of green space in urban areas, I expect that local legislature in central Ohio will further incentivize green roofs. I'm also hopeful that advancements in the industry will make living architecture more cost effective in the next decade.

GRP

To find a GRP, visit: http://goo.gl/AZ2uZh

CONFESSIONS OF A GREEN 'STARCHITECT'

AWARD-WINNING GREEN ARCHITECT EMILIO AMBASZ ASKS HIMSELF THE QUESTIONS NOBODY ELSE HAS DARED TO

BY: EMILIO AMBASZ

LEFT: EMILIO AMBASZ
Image provided by: Luis Grossman

ABOVE: FUKUOKA BUILDING
Image provided by: Hiromi Watanbe

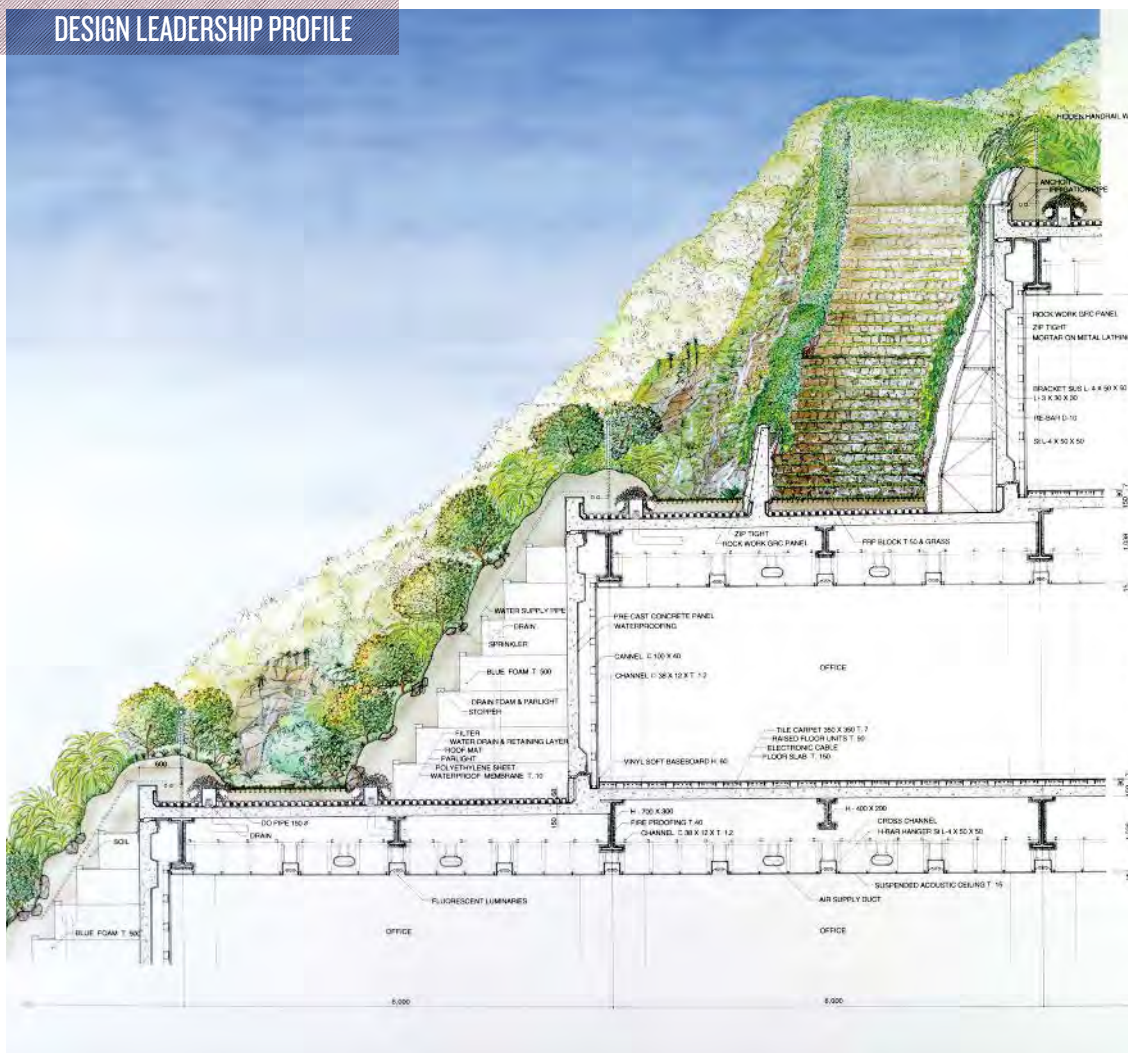
WHICH OF YOUR WORKS DO YOU CONSIDER THE MOST IMPORTANT AND WHY?

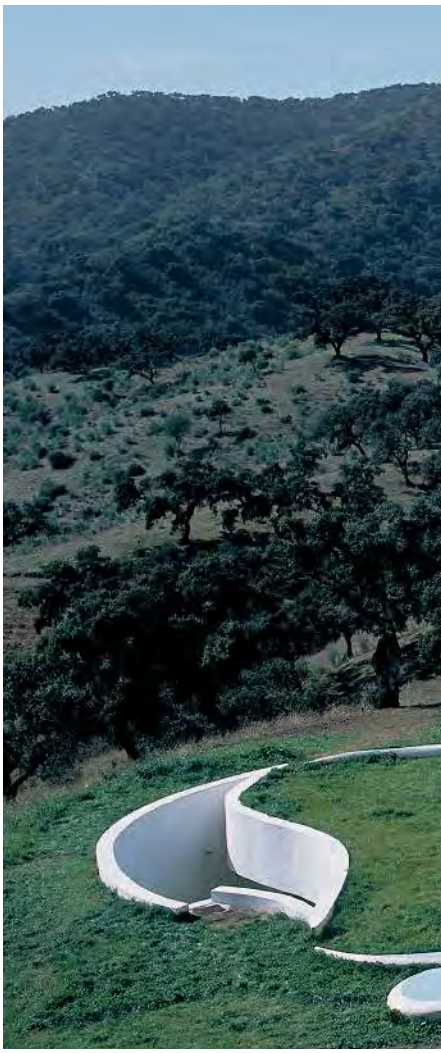
One of the most important is La Casa de Retiro Espiritual aka the "House in Cordoba." Contrary to everybody's expectations and hopes, it was built and stands quite proud and handsome.

Another important project for me is the one in Fukuoka. This building is, for me, very strong evidence that the prevailing notion "the cities are for the buildings and the outskirts are for the parks" is a mistaken and narrow-minded idea only favorable to commercial architects. The Fukuoka building demonstrates, once and for all, that you can have a building and the garden.

HOW DO YOU SEE YOUR WORK IN RELATION TO THE GLOBAL ENVIRONMENTAL MOVEMENT? DOES ARCHITECTURE MATTER HERE?

In my view, architects will stand far behind in the line of those sent to Hell for their environmental sins. But they will go, inevitably, if they do not honour their





LEFT: FUKUOKA BUILDING DESIGN
Image provided by: Emilio Ambasz

RIGHT: HOUSE IN CORDOBA
Image provided by: Fernando Alda

"I BELIEVE THAT ANY ARCHITECTURAL PROJECT NOT ATTEMPTING TO PROPOSE NEW OR BETTER MODES OF EXISTENCE IS UNETHICAL."

EMILIO AMBASZ

ethical responsibility to propose alternative models for the future. I believe that any architectural project not attempting to propose new or better modes of existence is unethical.

WHERE DO YOU PLACE YOURSELF WITHIN THE CONTEXT OF CURRENT ARCHITECTURAL PRODUCTION?

I know it sounds presumptuous, but I lay claim to being the precursor of current architectural production concerned with environmental problems. If there is any strength to my architectural ideas, it comes from the fact that I believe that architecture has to be not only pragmatic but also move the heart.

I rejoice immensely when I come upon somebody else's work that touches me, even if it is the architecture of someone like Gehry, for example, whose work is so different from mine, and whose concerns are totally unrelated to mine. What matters to me is that he sings his own song. His birds may not alight often in my garden,

but I'm sure they will pollinate my flowers.

DOES YOUR ARCHITECTURE HAVE A UNIVERSAL SUBJECT?

The architecture I create is steeped in mysticism. On the one hand, I am playing with the pragmatic elements that come from my time, such as technology. On the other hand, I am proposing a certain mode of existence which is an alternative. My work is a search for giving architectural form to primal things—being born, being in love and dying.

WITH EVERY CONCERNED ENVIRONMENTALIST AND SOCIOLOGIST IN THE WORLD TELLING US THAT VEGETATION, URBAN AGRICULTURE, GARDEN SPACES AND FORESTATION ARE ESSENTIAL COMPONENTS OF A CITY (FOR REASONS OF HEALTH, WELL-BEING AND PSYCHOLOGICAL STABILITY), WHY DO YOU THINK THE MAINSTREAM DESIGN WORLD STILL RESISTS THE USE OF LANDSCAPE—OR, AT BEST, SEES IT AS SOME KIND OF PERIPHERAL DÉCOR?

As you well know, he-men architects look down patronizingly on interior architects and exterior ones (meaning landscape architects). They feel very strongly that theirs is a true embodiment of the normal and natural and that those other two categories are just, at best, craftsmen or hairdressers. They have been taught that small little square windows, or that twisted and tilting planes (depending on their schools) is architecture. Their professors rewarded them handsomely for towing the party line. How can you expect them to utilize materials that are not the traditional ones; how can you expect them to try to integrate a building with nature when they are the proud heirs of a Greco-Roman tradition of mastering nature, standing above it and distinct from it?

HOW HAS YOUR THINKING ABOUT ARCHITECTURE AND ITS ROLE IN SOCIAL AND ENVIRONMENTAL REFORM CHANGED IN THE PAST FEW YEARS? ARE YOU STILL AS IDEALISTIC AND AS HOPEFUL AS YOU WERE TWENTY YEARS AGO?

For me, the definition of courage is not that of someone who marches into battle unconcerned, but that of someone who, trembling, nevertheless, marches ahead because that is what they must do. The lucidity of fear, if it doesn't paralyze, is a badge of honour.

I always knew that my pursuit of alternative models for a better future would be rejected, mocked, or, at best, I would be left alone to bark to the moon. But I always remembered that the madman who threw stones at the moon never hit her, but, in the end, no one else in the village could throw them as high. I still feel idealistic.

Emilio Ambasz is an award-winning green architect and designer.

FIND OUT MORE

To learn more about the Fukuoka building, visit: http://goo.gl/jwNX6.

SPRUCING UP

TWO PLANTS TO HELP REVITALIZE YOUR AGING GREEN ROOF: *CAREX* AND *PACKERA PAUPERCULA*

BY: MARGUERITE WELLS

As a green roof ages, it changes. The growing media may have changed from its initial organic matter levels, pH and fertility. Plant communities almost certainly have changed, unless a diligent maintenance plan has kept them static. There may have been disturbances to the plants and soils if there have been building repairs or construction after planting. Weeds may or may not have been controlled. So, depending on the green roof's maintenance history and client goals, the kinds and degree of green roof revitalization will vary.

For some small, naturalistic green roofs, virtually no maintenance may be perfectly successful. For a gently sloped shed roof with no drains to clean, with a mixed meadow aesthetic as the goal, well, renovation may never be needed. Natural volunteers of small grasses and wildflowers might improve the original plant mix and blend the roof into the surroundings quite nicely, much as the original Scandinavian green roofs did. However, on a diligently weeded sedum roof, a few goldenrods or grasses might look starkly out of place and need to be removed. On roofs with very precise planting patterns, if one species doesn't like the surroundings or it's been taken over by a nearby aggressive species, it may need a total replacement.

One opportunity I have seen for adding new species to an old roof is the knowledge that comes with time on the actual wet and dry areas on a given roof. Rather than forcing plants to grow in conditions they are not suited for, the

wet areas around drains present a great opportunity to add new species to the roof that will appreciate the extra water. Species in the sedge family, genus *Carex* are well-known for liking wet conditions. What is less-known is that many *Carexes* can tolerate extremes of wet and dry, even outright drought. There are a handful of

OPPOSITE TOP: PACKERA PAUPERCULA
OPPOSITE BOTTOM: CAREX EBURNEA
Images provided by: Tim Toland

Carexes that are common in the landscape trade, and which tend to be larger plants with higher water needs. Recent research has found some lesser-known native Carexes that thrive on green roofs, and have smaller statures. These include *Carex aurea*, *Carex crawei*, *Carex eburnea*, *Carex gracilis* and *Carex vulpinoidea*. There are also the better-known *Carex appalachica* and *pennsylvanica*, which are common in woodlands across the eastern US, and tolerate both drought and heavy shade. Each species has slightly different colors, growth habit and preferences. Some are clump-forming, such as *eburnea*; others form dense mats, like *crawei* and *pennsylvanica*. *Carex humilis* 'Hexe' gets specified occasionally, but is not a US native, and is tricky to grow in a nursery setting, so don't expect to procure lots of it. *Carexes* can only be planted on a roof as plugs or larger potted plants. They do not propagate easily from seed, and cuttings are not an option with grasses. *Carexes* have been gaining in popularity, so be sure to order with as much lead time as possible, due to slow propagation rates.

Another lesser-known North American native that naturalizes on green roofs is *Packera paupercula* (formerly *Senecio pauperculus*), Balsam Groundsel. A member of the *Asteraceae* family, it sports yellow daisy-type flowers on 12" stalks and oval leaves, growing in ever-expanding clumps. It self-sows readily on the roof, as its native habitat is rocky and sandy disturbed areas. Although never common in its native range, it can be found from Alaska to Maine, Colorado to Florida. In some states it is even listed as endangered, such as Connecticut, where, due to a lack of suitable habitat, it was probably never common. It is reputedly poisonous to consume, but its open flowers attract many pollinators, including rare ones. It can be planted as plugs, potted plants or even seed. The seed requires cold treatment before it will germinate, so it could be sowed in the fall for spring germination.

As we gain more green roof experience in North America, our plant palette continues to expand. It behooves us all to develop customer expectations in line with how green roofs work in the real world. In my view, that includes flexibility on plant choices, and realistic expectations of what a roof should look like at various times of year. We need to tell clients a realistic story of long-term ownership costs and maintenance efforts that reflect a given aesthetic.

Marguerite Wells is the owner of Motherplants.

GREEN ROOFS AND WALLS IN MUSIC CITY

10 COMPELLING REASONS TO ATTEND *CITIESALIVE* IN NASHVILLE THIS NOVEMBER

BY: REBECCA BLACK

At Green Roofs for Healthy Cities (GRHC), we're excited to be heading down to Nashville 'Music City' for the *CitiesAlive*: *12th Annual Green Roof and Wall Conference* November 12 to 15, 2014. There are so many reasons to join us in this fun-filled, musical market that boasts progressive policies and serious stormwater management targets (but, we'll just give you 10!).

LEARN MORE ABOUT STORMWATER REGULATIONS AND GREEN ROOF REBATES IN NASHVILLE AND THROUGHOUT THE STATE OF TENNESSEE

Metro Government of Nashville Green Roof Rebate:
http://goo.gl/taH5d4

Tennessee Department of Environment & Conservation Stormwater Permitting:
http://goo.gl/rgaEdV

Tennessee Stormwater Association:
tnstormwater.org

1. THE LATEST AND MOST INSPIRING PROGRAMMING

If you want to learn about green roofs, walls and stormwater management in 2014, the two full days of programming at *CitiesAlive* will not fail to inspire. Under the timely theme of Water: The Key to Everything Green, delegates from across North America will hear from leading experts in green roof and wall research and policy; and be exposed to industry-leading designs that are not only aesthetically-pleasing, but perform essential stormwater management roles as jurisdictions across the country grapple with ever-more-extreme weather events.

2. THE INDUSTRY CONNECTS

Professional relationships are made, strengthened and reinforced every year at *CitiesAlive*. From the delegate reception to trade show mixers to the Awards of Excellence celebration, this year's networking events at *CitiesAlive* will aim to take full advantage of the free-wheelin' spirit Nashville is known for.

3. NASHVILLE'S GROWING GREEN ROOF AND WALL MARKET

Showcase your company's products and services at the *CitiesAlive* trade show and reach Nashville's growing market for green roofs. The City boasts supportive policies, including one of America's most generous green roof rebates ($10/sf) and a new wave of construction is taking off now. Plan to get in the action this November at *CitiesAlive*.

4. REGIONAL BUSINESS DEVELOPMENT OPPORTUNITIES

Statewide stormwater policy mandates have been set in Tennessee, and *CitiesAlive* will attract other valuable regional markets, including Memphis, Knoxville, Chattanooga and Atlanta—who are setting stormwater policy. As the industry continues to grow, don't miss this targeted opportunity to build your business at the *CitiesAlive* trade show.

5. MUSIC, FOOD & FUN

There's so much to experience in Nashville. Whether

OPPOSITE: MUSIC CITY CENTER GREEN ROOF IN NASHVILLE
Image provided by: Greenrise Technologies

ABOVE: PINNACLE GREEN ROOF IN NASHVILLE
Image provided by: Brian Phelps

you're interested in visiting the Country Music Hall of Fame (attached to the *CitiesAlive* venue), eating world-famous barbeque, trying some Tennessee 'hooch' at the lively honky-tonks along Broadway Street (a two minute walk from the venue), shopping for cowboy hats and boots, or all of the above…Nashville will keep you busy with great culture, food and drinks, and a host of friendly locals to boot.

6. DELUXE GREEN VENUE

Nashville was recently named a top destination for green meetings, and our *CitiesAlive* venue, the brand new Omni Nashville Hotel, is a star green venue, with famously friendly staff and fantastic food, that's located directly across the street from the award-winning Nashville Music City Center with its four acre green roof.

7. PROFESSIONAL DEVELOPMENT AND ACCREDITATION OPPORTUNITIES

At *CitiesAlive*, you can conveniently earn essential continuing education units and professional development hours, while improving and diversifying your industry acumen and professional credentials. GRHC training courses are registered with LA CES, GBCI, AIA CES, APLD and GRHC.

8. GREEN ROOF TOURS

There's nothing like seeing projects up-close and personal, and *CitiesAlive* green roof and wall tours do just that. With knowledgeable guides leading the way, come and visit the most interesting projects that Nashville and the region have to offer. It's a fun and educational way to get to know Nashville, and your professional colleagues too.

9. *CITIESALIVE* IS THRIVING

The *CitiesAlive Green Roof and Wall Conference* is a strong and growing marketing and sales opportunity. The numbers from *CitiesAlive* 2013 in San Francisco show growth on all fronts: a 12.6% year over year increase in participation; and the *CitiesAlive* brand attracted a record 400,000 unique impressions in 2013 via our website, print ads, social media, flyers and media and association partnerships.

10. COMMITTED TO GROWTH

But we're not resting on last year's growth...we've combed through survey results to find out how delegates and GRHC members suggest we improve our event. We're continuing to make new efforts to improve the value of participating at *CitiesAlive* in 2014. We're doubling dedicated time on the trade show floor. We're connecting early with regional industry associations to draw local participation. We're keeping the 'a la carte' registration that proved successful for bringing in new local participants last year. And we're always open to suggestions…give us a call!

Rebecca Black is the director of business development at Green Roofs for Healthy Cities. Contact her at rblack@greenroofs.org to discuss sponsorship, trade show and programming opportunities.

FIND OUT MORE

You're invited to Nashville for *CitiesAlive*. Take advantage of early bird trade show and delegate registration rates at www.citiesalive.org.

SPACE IN TRANSITION

RYERSON UNIVERSITY'S FIRST GREEN ROOF GETS AN URBAN AGRICULTURE FACELIFT

BY: VINCENT JAVET

Sitting on top of Ryerson University's George Vari Engineering and Computing Centre in Toronto is a 10,000 square foot (sf) extensive green roof. There are numerous stories about why the building ultimately decided to go green, but one thing is for sure, the green roof installation has undergone dramatic changes since the building was completed in 2004.

The original green roof (made possible in 2004 by a $150,000 donation by Canadian broadcaster and Ryerson alumni Valarie Pringle) began as a project to both beautify a rooftop for concerned condo owners as well as to support cutting edge research. Ryerson selected Gardens in the Sky (now Flynn Canada) to design and construct the green roof. The green roof consisted of day lilies, generously planted apart, setting the stage for Mother Nature to work her magic on the open spaces between the plantings. After almost half a decade of limited maintenance and poorly timed weed whacking, the green roof was flourishing, but not as planned. Over 30 different pioneering species had managed to become established. These ranged from weeds like Ragweed to trees such as the Norway Maple. The green roof had become full of biodiversity, but it was difficult to manage.

The newest vision for this Ryerson University green roof was that of an urban rooftop garden. Enter Rye's HomeGrown (a Ryerson University sustainability group) and a well-rounded team of capable and seasoned urban farmers and volunteers. After numerous discussions and meetings, the conversion of the George Vari Engineering and Computing Centre green roof to an urban rooftop farm was given the green light.

The green roof contains two sections of plant material and one was granted as a trial site for Rye's HomeGrown to conduct the conversion. The site granted for conversion is considerably smaller than the secondary patch—978 sf—but it does offer wind protection providing a microclimate benefit to rooftop gardening.

The roof serves as an example of what can be done when an existing green roof requires revitalization. "The conversion of Ryerson's rooftop not only has enormous potential to increase food production on campus, but also brings an incredible opportunity for hands-on education in urban agriculture within the univer-

sity community," said Arlene Throness, Rye's HomeGrown coordinator. "Locally produced food within our community is imperative for a healthy environment and society. As sites for innovation and education, universities are strategically positioned to inspire and initiate broad-scale changes within the food system."

The first phase of the Ryerson University green roof conversion took place in May 2013. Rye's Homegrown began by using a cut and cover technique known as sheet mulching. The team began by pulling the existing lilies as well as cutting other existing pioneering plants. The cuttings were gathered for composting use at a later date. At this point the goal was to kill off all existing plant material that had once survived on the roof. "The plant matter was left in place to decompose under a tarp, both eliminating the need for it to be hauled away and increasing the organic matter and nutrient content in the soil," Throness said. Plastic sheets were laid over top of the growing media for three weeks to ensure that all remaining root systems and overlooked seedlings would die out and not reproduce.

The second phase then involved bringing 3,600 liters of topsoil up to the roof to increase the growing medium depth, from the existing five inches to eight inches, for vegetable planting. After adding worm compost to the soil it was time to lay out an irrigation system. The irrigation system consists of a manually engaged do-it-yourself drip tape kit, which was laid out to run in rows up along the plot of land. This step proved to be especially essential to the project's success due to the vegetables immense demand for water and wet soil. The final preparation phase involved the laying of a corn-based biofilm, which is commonly used in organic farming to deter weeds as well as keep soil conditions desirable for plants.

"THE CONVERSION OF RYERSON'S ROOFTOP NOT ONLY HAS ENORMOUS POTENTIAL TO INCREASE FOOD PRODUCTION ON CAMPUS, BUT ALSO BRINGS AN INCREDIBLE OPPORTUNITY FOR HANDS-ON EDUCATION IN URBAN AGRICULTURE."

ARLENE THRONESS

After months of preparation, Rye's HomeGrown had adapted the existing green roof conditions to that of a roof that was fertile and able to foster a plentiful urban agriculture harvest. The planting was laid out in four rows in two planting plots which are separated by an aluminum clad protrusion (an existing condition of the building design). Plantings included sweet peppers, hot peppers, squash, eggplants,

RYE'S HOMEGROWN PLANTS PRODUCE ON RYERSON UNIVERSITY'S NEW AGRICULTURE-FOCUSED GREEN ROOF
Image provided by: Vincent Javet

IN TRANSITION: RYERSON UNIVERSITY'S FIRST GREEN ROOF GETS AN URBAN AGRICULTURE FACELIFT

Images provided by: Vincent Javet

celery, cucumbers, melons and zucchini. The method used for planting the vegetables involved poking holes into the biofilm by hand and setting the plant's root system into the soil with vermicompost. The produce harvested so far has been donated to Ryerson's cafeteria as well as sold at a farmers' market organized by Rye's Homegrown.

Since the planting of the vegetables in 2013, the city of Toronto has undergone various weather related hardships. There have been weeks of straight rain, an intense heat wave, as well as a flood that singlehandedly shut down parts of the city. Rye's Homegrown was happy to announce that the urban agriculture conversion roof held up to the toughest of weather conditions Toronto's climate could toss its way. The plantings flourished and over 520 pounds of produce were harvested throughout its first year.

It is a logical conclusion that the successful conversion of the first patch of Ryerson University's green roof should present Rye's HomeGrown with an opportunity to work with the second patch of green roof on the building. That being said, there are a number of ideas currently surrounding the conversion of the second green roof plot, including exploring the opportunity for a more symbiotic relationship of edible planting to be mixed with the existing greenery. "There is a unique opportunity with the green roof to marry a mixed planting of wild plants interspersed with rows for vegetable production so that you are not only producing food, but also increasing plant and insect biodiversity in an urban location," said Reg Noble, academic coordinator of Ryerson's Continuing Education Food Security program. A project of this caliber on the second plot of green roof would certainly be poised to become the first of its kind.

This project begins an important conversation about the future of green roofs and their progression as we continue to move forward as a society and work towards building cities that are sustainable and resilient.

Vincent Javet is a senior researcher at Green Roofs for Healthy Cities.

FIND OUT MORE

For more photos of this project and a complete plant list, visit: http://goo.gl/jwNX6.

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BIG BOX RETAILERS EMBRACING GREEN ROOFS?

THE CLIENT SPEAKS!—WALMART OPENS UP ABOUT THEIR GREEN ROOF LIFE CYCLE COST-BENEFIT ANALYSIS, THE IMPORTANCE OF SUPPORTIVE POLICY AND MORE

BY: DON MOSELEY

THE COST-BENEFIT ANALYSIS

Walmart has completed a study of the performance of green roofs in collaboration with Arup, Roofmeadow, Pennsylvania State University, the Green Team and University of Toronto researchers. This work centered on a research roof built in 2006 at Walmart store #5402 in Chicago. The 133,000 square foot roof is just over half green (vegetated) and just under half white (cool) roof. When constructed, this roof was the largest, most intensively monitored green roof in the world. Each side was instrumented with equipment to measure variables impacting store energy use and stormwater runoff dynamics. Monitoring ran for three years. Data analysis included incorporation of field results into detailed models.

Energy

The green roof saved energy compared to the white roof. If a full store had a green roof, the data suggests it would save 1-6% storewide in a range of climates, with a 2.2% savings estimated in Chicago. Roof temperatures were up to 40 degrees cooler during hot weather on the green roof, but savings from the green roof were greater in cold weather than in warm weather. Summer savings would be higher if the basis for comparison was a black roof rather than a white one, but Walmart builds new stores in the United States with white roofs. The green roof has an added benefit of peak load shifting due to its thermal mass. This study is one of the first to also demonstrate that the green roof moderates air temperature at rooftop HVAC unit intakes. This translates to air conditioning savings in summer, as well as heating savings in winter.

Stormwater

Stormwater retention and peak rate attenuation are two important criteria affecting city storm sewer capacity and water quality in lakes, rivers and bays. This study showed that a green roof can retain more rainfall than previously found by most studies of smaller roofs. Up to 3.5" were detained during some rainfall events. The soil layer on the roof is only 4" deep, with 3" of media over a 1-inch foam-type drainage mat. No ponding or drain clogging on the green side was observed. Of the 100 precipitation events that were studied, the green roof retained an average of 74% (80-90% of small storms and 60% of the largest storms). Peak runoff from the green roof was delayed 1.25 – 3.25 hours from the rainfall peak, and the rate was 50% to 85% lower than the precipitation peak rate (average 65%).

Maintenance and Roof Life

The Walmart Chicago green roof costs roughly 45% less to maintain than a typical white Walmart roof. This is due primarily to the protection the green roof affords the membrane and drains, preventing damage and clogging. Minimal selective weeding and avoidance of irrigation at this location helps to keep green roof maintenance costs low. Green roofs also can be expected to extend the life of the waterproof membrane from a typical 15 years (as low as 10 or as high as 25) to 40 or more years.

The Bottom Line

A financial analysis was done for green vs. white roofs in 9 locations (6 metro areas). The approach to this financial analysis differed from a typical one, in that it compared not just the two roofing systems in isolation, but a development package that includes a green roof with one that uses more conventional means to comply with relevant regulations. The results showed green roofs have a less than 20 year payback for all locations studied. One third of the total show a 0-3 year payback. Of the locations studied, Portland had the highest potential green roof net present value (NPV) for variables considered, and the only first cost savings potential, even excluding the direct incentive. This study demonstrates that in the right policy environment, green roofs can be an attractive voluntary choice for a retail developer like Walmart.

THE ONE-ON-ONE

WHY DID WALMART DECIDE TO IMPLEMENT GREEN ROOFS ON SOME OF THEIR STORES? HOW DID WALMART JUSTIFY THE

COSTS? HOW DID WALMART DECIDE WHAT STORES TO IMPLEMENT THEM ON?

DON: I had been given a great privilege back in 2003 being assigned to oversee the design of two experimental stores in McKinney, Texas and Aurora, Colorado. These two stores had a specific mission associated with them from senior leadership to explore new materials, new technologies and new ways of designing and building stores. In the spring of 2004, I was seeking budget and scope approval for the two stores and that meeting included a discussion for both of them to have some small test areas for green roofs for research purposes.

Lee Scott, our CEO at the time, had just returned from the city of Chicago, having been there to meet with Mayor Daley, in an effort to get a Walmart store in the city of Chicago. Mayor Daley was working towards what later became the ordinances for the city that would, in certain scenarios, require green roofs; but at the time, green roofs weren't required. A mutual agreement had been reached that we would be supported in building a store in Chicago and part of our agreement was that we would build a store that was fifty percent green roof. Mr. Scott challenged me that instead of doing the two smaller green roof test areas on the experimental stores, that I make the application to this project in Chicago that would have a much larger green roof and potentially much better opportunity to learn. With that direction, I proceeded working on the Chicago store, to be purpose-built for research, and we obtained the budget internally to fund that research.

WALMART'S CHICAGO GREEN ROOF
Image provided by: Walmart

We have not yet voluntarily pursued a green roof project, from a business standpoint. We did the Chicago project to learn—we funded that ourselves. That was not a cash-positive business decision. That was an internal business decision made illustrating that we wanted to understand this better; we wanted to invest in learning and were willing to share that knowledge and experience. We designed and built the green roof in Chicago because of an arrangement with Mayor Daley. We have since designed and built another green roof in Portland because of an agreement with the Mayor there as well. The other two stores that are in Chicago are because it is now required by code.

TWO OF THE GOALS SET BY WALMART FOR THIS STUDY WERE: TO LEARN LESSONS ABOUT WHETHER AND WHEN GREEN ROOFS MIGHT BE A GOOD CHOICE FOR VOLUNTARY APPLICATION ON FUTURE STORES; AND TO DOCUMENT ANY KEY LESSONS THAT MIGHT CONTRIBUTE TO SUCCESS ON FUTURE PROJECTS. WHAT CONCLUSIONS DID WALMART COME TO REGARDING THESE TWO GOALS?

DON: Well, I think the summary in the white paper talks about some of the markets where those potentials might exist. We have not yet identified a store where we think there's a business case to voluntarily, from a business standpoint, build a green roof. But we think that scenario probably does exist and we're looking for it. We build stores to operate a retail business, so we're going to try to build those in the economical manner that has a good return on our investment. It's not something that we're going to just voluntarily do to add cost to projects—but, if there's a business case there—through the combination of incentives or reduction in impact fees, coupled with some energy benefits, thermal benefits and maintenance cost benefits, we will consider and explore the potential to build a green roof there. We do not have all the answers, there's no question about that. We have more

GREEN ROOF EXPECTED PERFORMANCE (VS WHITE ROOF)

	Simple Payback (years)	Internal Rate of Return (IRR)	40-yr Net Present Value (NPV) Discounted
Chicago*	17	9.30%	$ (94,835)
Chicago Combined Sewer Area*	17	14%	$ 106,130
Philadelphia	3	36.40%	$ 225,695
Philadelphia Combined Sewer Area	14	10.20%	$ (28,472)
Austin	18	3.90%	$ (527,903)
Portland	immediate	n/a	$ 1,529,029
Portland Combined Sewer Area	immediate	n/a	$ 703,966
Minneapolis	18	4.00%	$ (486,290)
District of Columbia	10	13.40%	$ 64,301

Walmart has approximately 4,800 retail locations in the United States (this includes all formats, such as Sam's Club). Of these 4,800 locations, 5 have green roofs (3 in Chicago, 1 in Portland and 1 in Washington, DC).

questions now than we had before.

HOW DOES WALMART RESPOND TO CRITICISMS SUCH AS "WALMART IS FAILING ON CLIMATE EXACTLY LIKE IT IS FAILING ON WORKER'S RIGHTS"? HOW DOES SUSTAINABILITY CONTRIBUTE TO YOUR OVERALL COMPANY STRATEGY?

DON: The sustainable initiatives that we're putting into green roofs or any other aspect of our facilities, and the decisions we make, are part of running a sustainable business. We are here to stay in business, so sustainable business decisions are critical, and the two don't have to be exclusive of each other. But that being said, you can't just invest money in something because it makes people happy, or you feel good, if it doesn't help your business.

WHAT ADVICE WOULD YOU GIVE TO OTHER BIG BOX RETAIL DEVELOPERS WHO ARE CONSIDERING GREEN ROOF INVESTMENT?

DON: Do the math. And try to make sure you've accounted for all of your potential attributes. Remember the benefit to your air, your intake air, through those units – it's a legitimate number. It's a few percentage points of your energy saved, but it's real money. And that alone isn't enough, but if you start adding up all the little pieces, whether it's the maintenance reduction, or thermal benefit, or energy reduction, or stormwater benefit, impact fees, offsets— make sure you get your math right. And hire the best consultants you can afford.

Don Moseley is the senior manager of sustainable facilities and multi-level facilities at Walmart. He has worked for the company for twenty-four years.

FIND OUT MORE

Full Walmart green roof cost-benefit analysis report: http://goo.gl/QlxjO0

Video tour of Walmart green roof in Chicago: http://goo.gl/xj8oNj

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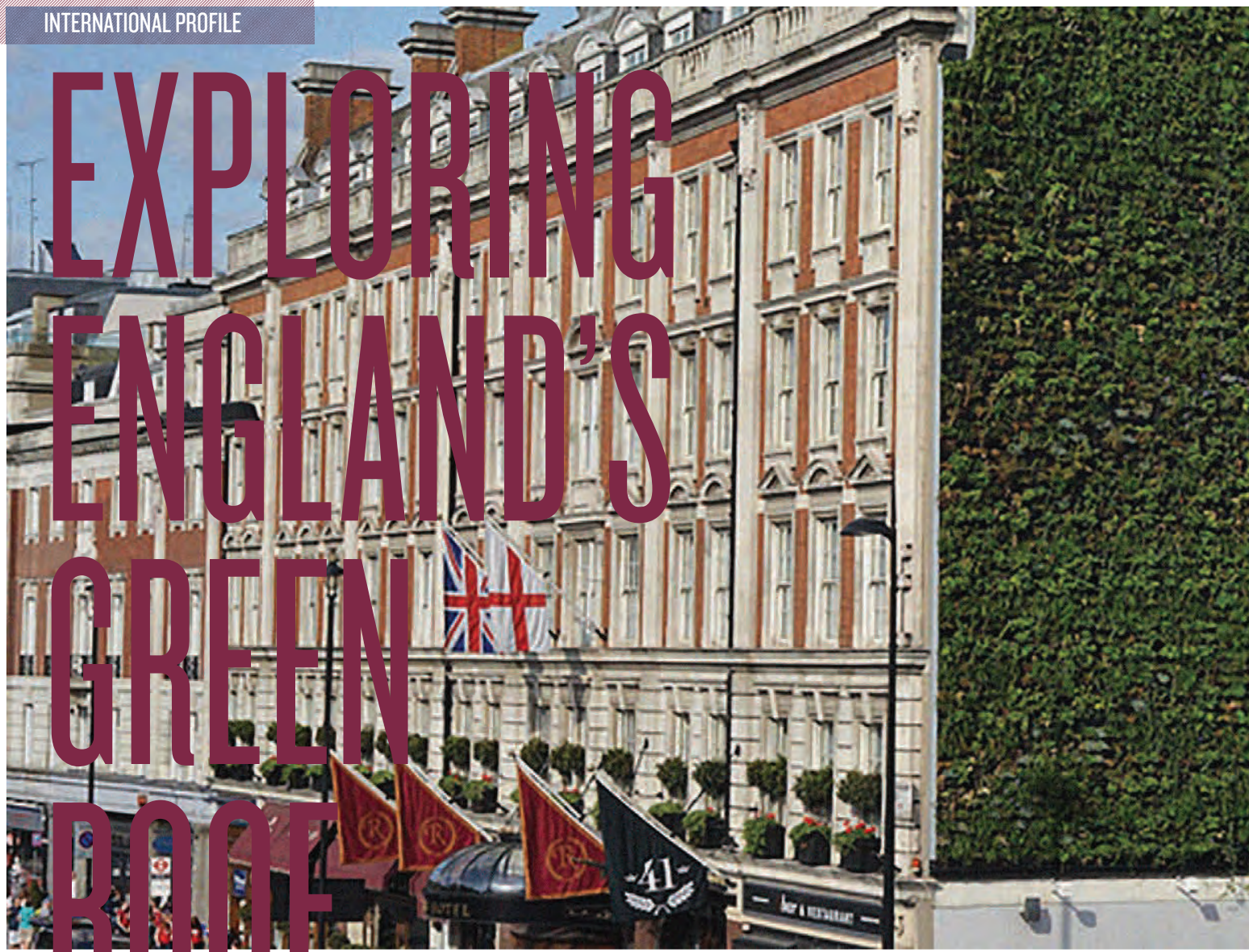
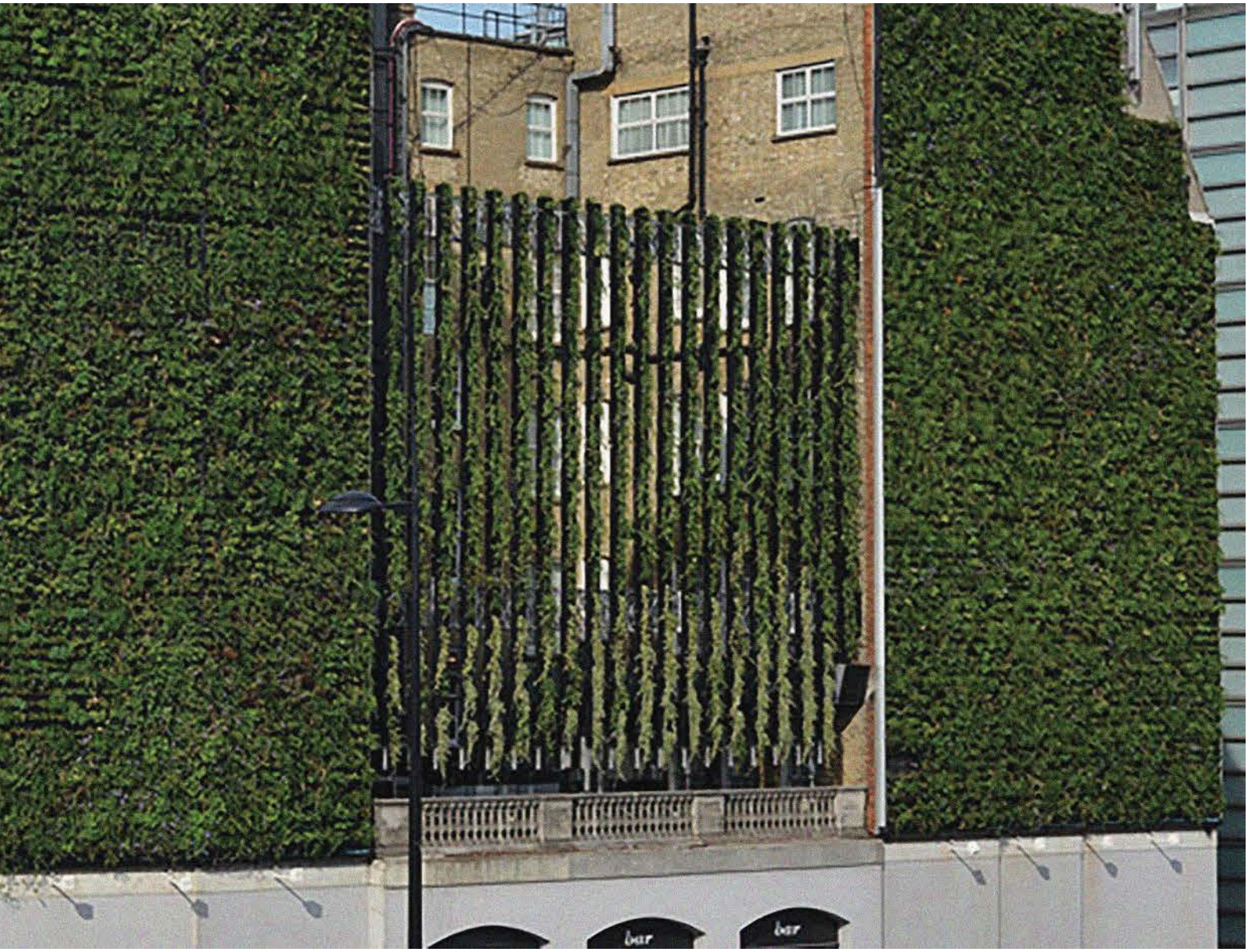


EXPLORING ENGLAND'S GREEN ROOF AND WALL INDUSTRY



LIVING ARCHITECTURE RESEARCH, POLICY AND MARKET DEVELOPMENT IN THE UK'S LARGEST COUNTRY

BY: EMILY GILLINGS-PECK

Europe has the oldest market for green roofs and walls. The modern market thrives in Germany, which remains the only country in the world to have national level building code requirements and tax exemptions for green roofs. England is still a relatively young market in the green roof and wall industry and there is still much work to be done at the government level. However, it is quite clear that there are many committed researchers and policy makers pushing the green roof and wall industry forward into the spotlight.

PREVIOUS PAGE: RUBENS AT THE PALACE LIVING WALL IN LONDON, ENGLAND
Image provided by: Rubens at the Palace

ABOVE: SHARROW SCHOOL OF SHEFFIELD GREEN ROOF IN SHEFFIELD, ENGLAND
Image provided by: Dr. Nigel Dunnett

RESEARCH

There is ground-breaking living architecture research being done at universities across England. The Royal Horticultural Society and the University of Reading, headed by Dr. Tijuana Blanusa, are researching the thermal aspects of green roof plant selection. Dr. Cedo Maksimovic at Imperial College, University of London is investigating the integration of green and blue infrastructure. Further research is being done at Staffordshire University by Dr. John Dover into the establishment of a Green Wall Centre to promote green wall technology.

The Green Roof Centre at the University of Sheffield is the UK's main interdisciplinary research centre for green roof technology, focusing on biodiversity, green roof plant selection, substrates and stormwater management. Research has been ongoing since 1999, and is being conducted by Dr. Nigel Dunnett, Christine Thuring

"THE EUROPEAN UNION IS A MAJOR AND SIGNIFICANT SOURCE OF RESEARCH FUNDING THAT LINKS RESEARCHERS ACROSS NATIONAL BOUNDARIES," SAYS DR. NIGEL DUNNETT, A SENIOR LECTURER IN URBAN HORTICULTURE AT THE UNIVERSITY OF SHEFFIELD. "THAT SAID, MOST GREEN ACTIVITY OCCURS AT A NATIONAL LEVEL AND I DON'T THINK THERE IS EUROPEAN LEVEL ACTION ON THIS THAT HAS MADE AN IMPACT."

and Dr. Virginia Stovin.

The Sharrow School of Sheffield is the first nature reserve in the country and has a webcam installed on the roof, providing opportunities for research. Dr. Thomas Pugh at Lancaster University and scientists at University College London are also conducting research on building integrated vegetation (BIV) to remove particulate matter (pollutants) from the air, by choosing broad-leafed species such as *Crassulaceae*.

POLICY

Throughout the country, there are no major national green roof and wall policies, though local governments and councils are working individually to advance green policies. Sheffield, 170 miles northwest of London, is seen as the green capital of the UK, with an estimated 120 green roofs across the city, as well as the country's first municipal green roof policy and a Local Biodiversity Action Plan. Although the green roof policy doesn't incentivize or require green roofs, it strongly recommends them as a method to combat climate change, resources and sustainable design in the city's core sustainability strategy.

London is also seen as pushing the boundaries both on a national and international scale. The City of London has soft guidelines for incorporating green roofs and walls into commercial buildings, and tax exemptions for green roofs. With the weather constraints of the region, and across the nation, flood management is at the forefront of discussion. According to the Environment Agency, approximately 534,000 properties in London are on the Thames floodplain and one in four is at risk of flooding, partly due to the low absorbency of urban surfaces. That said, the city does not mandate green roofs, rather offers tax benefits under the Drain London program and expects corporate buildings to incorporate living roofs and walls 'where feasible'.

PROJECTS

In August of 2013, the country's largest living wall (estimated) of 350 square meters (3,767 sf), made up of over 10,000 plants, was unveiled near Victoria station, which is said by experts to prevent flooding in central London. The wall, on the Rubens at the Palace hotel, will be able to catch up to 10,000 litres (2,641 gallons) of water, and is made up of 20 types of seasonal plant species including buttercups, crocuses, strawberries and winter geraniums. Matthew Pencharz, the mayor's advisor for environment and energy says, "the mayor is encouraging more green initiatives like the living wall to make sure London can continue to compete, not only as the greenest city in Europe, but as the best big city on earth."

Emily Gillings-Peck is an English literature and linguistics student at Queen Mary, University of London in London, England.

FIND OUT MORE

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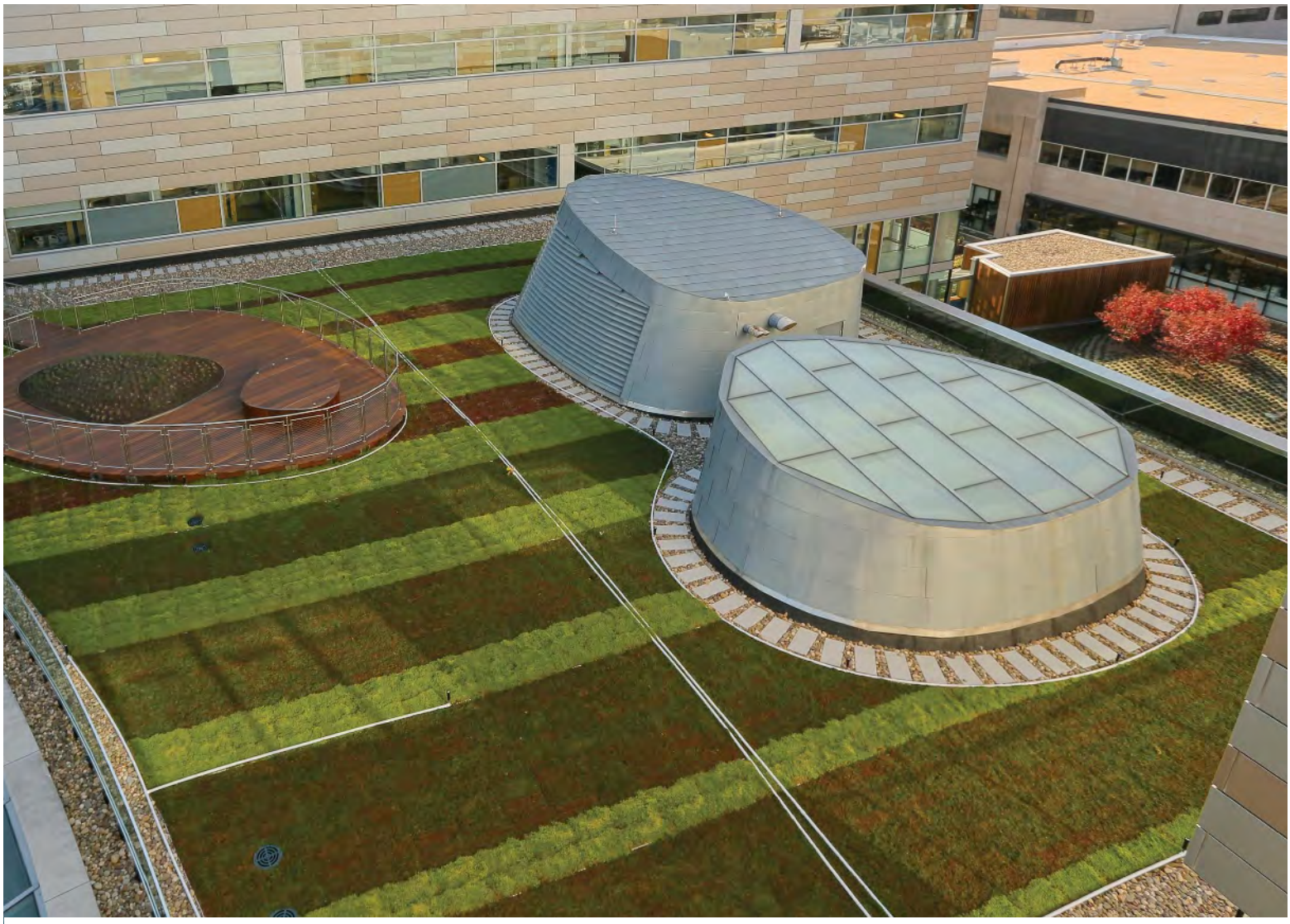

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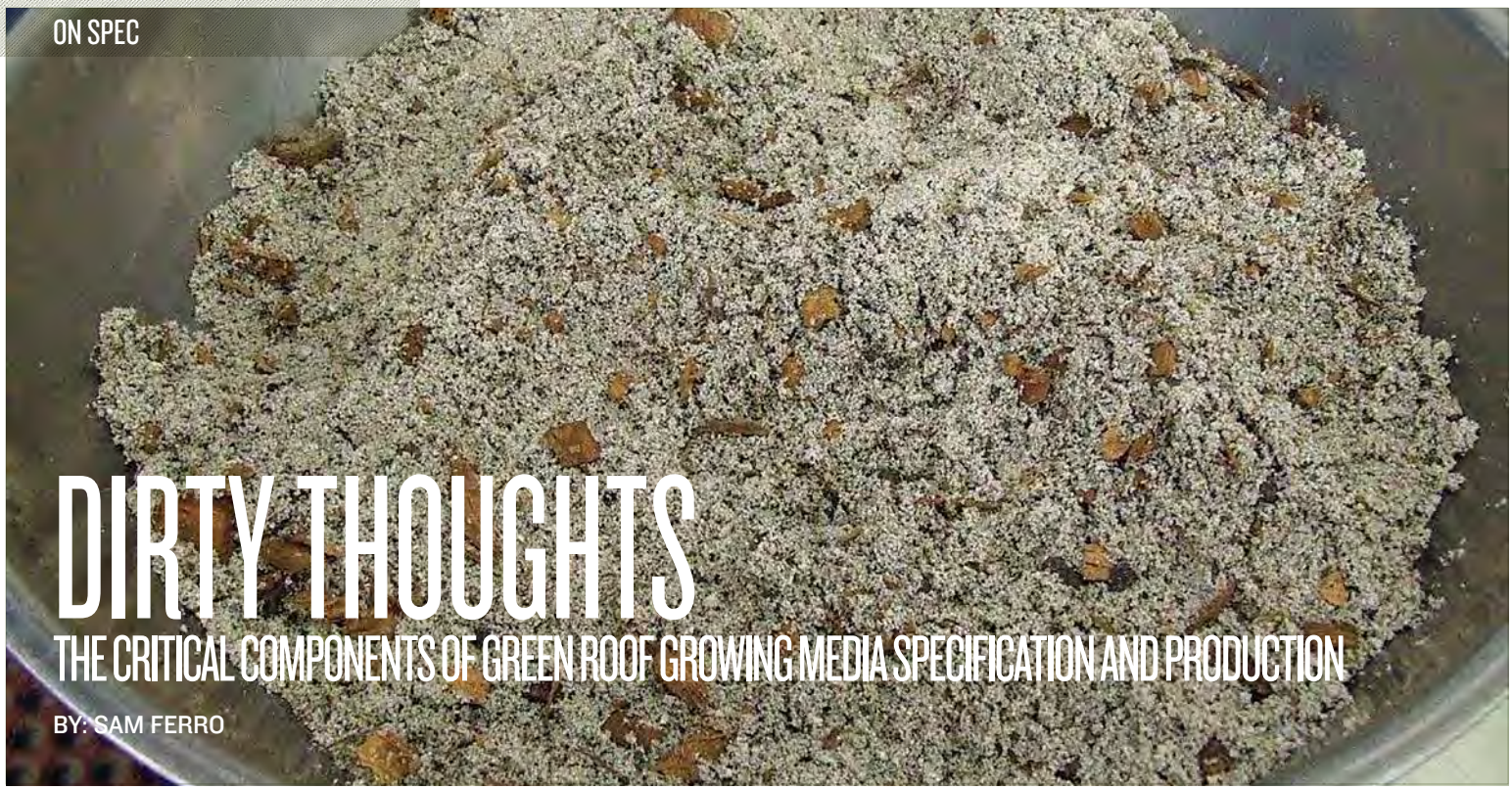

DIRTY THOUGHTS

THE CRITICAL COMPONENTS OF GREEN ROOF GROWING MEDIA SPECIFICATION AND PRODUCTION

BY: SAM FERRO

Green roof growing media is not your everyday garden soil variety. Sure it has to retain water and nutrients and provide a hospitable environment for plant growth, but there is much more that is required. Growing media must be lightweight, provide effective drainage, and in many cases, retain significant amounts of water or at least slow runoff.

With the intense performance requirements for green roof growing media, it should come as no surprise that native soils do not provide a proper environment. To ensure a quality growing media, specialized soils must be manufactured to meet project requirements. These specialized soils are typically manufactured from multiple components that may include sand, compost, light-weight aggregates and more.

Locally sourced materials are the most cost-effective components for growing media, as they typically have lower shipping costs and fewer delays. Once components have been sourced, they have to be blended to create a consistent soil mix that meets project specifications and client needs.

The desired green roof growing media can vary widely depending upon intended usage. Stormwater control requires something different than what wetlands would require. Intensive mix blends with their deeper depths are typically not the same as extensive mixes. Thus, proper components and component ratios are crucial to achieve desired performance. How do suppliers come up with mixes to meet project needs? It depends on the specifications, and a well written specification is critical to project success.

Growing media specifications can be divided into two broad types. Material specifications call for what components to use and how much of each component goes into the mix. Performance specifications typically focus less on specifying particular materials, and more on detailing what the performance of the blend should be (permeability, wet weight, water retention, etc.). Performance specifications are often preferred because they allow for some flexibility in materials and focus on the characteristics of the final blended material. Regardless of specification type, it is imperative to know what performance is expected from the roof before a growing media can be prepared. Factors such as available materials, type of vegetation, water management, material depth, load limits and intensity of use must be considered.

Laboratory testing should be a critical component of green roof specifications and production. An experienced lab can help make the mix development stage go faster and produce a better mix. Jeff Bruce of Jeffrey L Bruce & Co. equates media production to water coming from a faucet: "you have to expect fluctuations." Testing by an experienced green roof lab can tell us what those fluctuations are. It is then incumbent upon the designer or other professionals to determine whether they are significant. On-site observations and proper care of the media delivered to the job site are also critical. Soils are living environments and must be treated as such. Timing of media installation and proper handling of materials are crucial.

GREEN ROOF TRIAL GROWING MEDIA BLENDS
Image provided by: Turf Diagnostics & Design

Green roof growing media are complex mixes, requiring multiple components blended at precise ratios. A team of professionals with diverse expertise is needed to design and create these mixes. When quality materials are combined with knowledgeable people, the growing media should perform well on the roof and provide optimal conditions for plant growth.

Sam Ferro is the president of Turf Diagnostics & Design.

Thanks to Jeff Bruce, Dick Hayden (American Hydrotech), Kevin Anderson (Missouri Organic), Scott Jenson (Utelite) and Charles Duprey (WeCare Organics) for their input.

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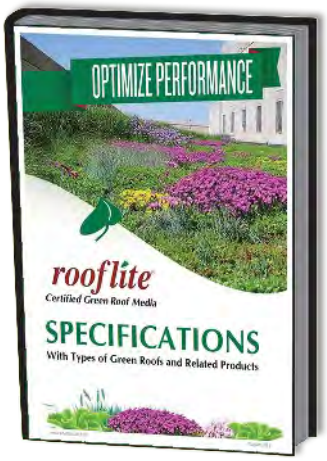

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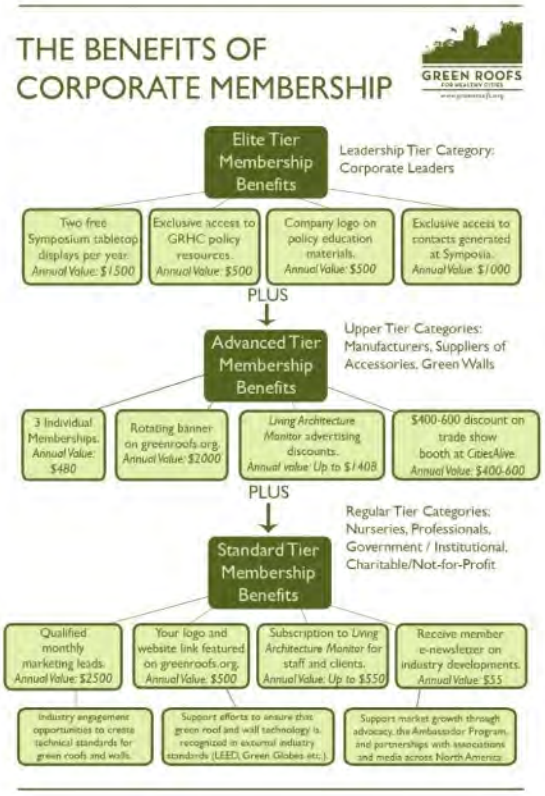
BRINGING MEMBERS UP TO DATE:
GRHC CORPORATE MEMBERSHIP IS UNDERGOING A FEW CHANGES

Green Roofs for Healthy Cities (GRHC) is constantly looking for ways to improve the benefits of membership. As part of these efforts, GRHC has over the past year:

- Forged a mutually beneficial partnership agreement with CADdetails that offers GRHC corporate members a $1,000 discount on a CADdetails subscription
- Established corporate member discounts for trade show booths
- Launched a revamped monthly member e-newsletter with more useful industry information
- The enhanced online promotion of GRHC Corporate Members via GRHC and LAM websites, and social media, with much more of this news being picked up by Google News feeds

As part of GRHC's efforts to ensure that its corporate membership program best represents its members, the organization is revising its membership structure for 2014. Revisions are the result of valuable consultation from GRHC staff, current GRHC members, and the corporate members committee, and were passed by the GRHC Board of Directors in January 2014. These changes will take effect for corporate members newly joining the organization on February 1, 2014, and for existing members on May 1, 2014.



Some membership categories will change to reflect shifts in the green roof and wall market. A small number of companies will be moved to categories that more accurately represent their business and this may affect their contribution amount. Below are the category changes:

- A new category called *Corporate Leaders* will be established for members previously in the *Manufacturers* category that are also funding GRHC's policy educator position
- *Distributors & Suppliers* will become *Suppliers of Accessories*
- *Suppliers of Components* will cease to be a category. Members in this category will be distributed to more suitable categories.

As well, there will be an 8% rise in corporate membership dues (rounded to the nearest $50 mark) to reflect inflation rates in the United States and Canada over the past five years. The last time membership dues were changed was in 2009. The distribution of benefits to membership categories will also change slightly. View the image above to see the distribution of benefits. If you have any questions about these membership revisions, please contact membership coordinator Paul Erlichman at membership@greenroofs.org or 416-971-4494 ext. 223.

We are all in this effort together and the changes are universal across the membership. This update of the membership structure, alongside new corporate member recruitment, will ensure the health of the Green Roofs for Healthy Cities and its efforts to promote awareness of green roofs and walls around North America. We look forward to growing this industry with you over the years to come.

Oscar Warmerdam
President, Sempergreen USA
Chair, GRHC Corporate Member Committee

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○ Green Walls ($1,250) ○ Distributors & Suppliers ($3,800) ○ Manufacturers ($5,200) ○ Corporate Leaders($12,700)

PLEASE CHOOSE THE TITLE THAT BEST DESCRIBES YOU OR YOUR ORGANIZATION:

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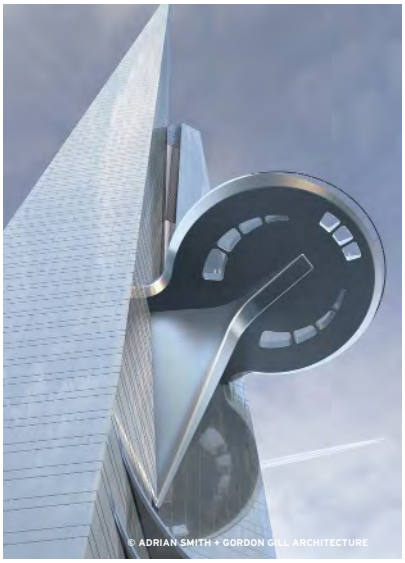

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