



LIVING ARCHITECTURE MONITOR

A GREEN ROOFS FOR HEALTHY CITIES PUBLICATION

VOLUME 17 / ISSUE 3 / FALL 2015

DON'T MISS
CITIESALIVE NEW YORK
OCTOBER 5-8, 2015

RESIDENTIAL ISSUE

On The Roof With... Four Experts Share Residential Project Tips
Confessions of a Pioneering Green Designer - Diana Balmori
A Researchers Dream: New York Park's Amazing Research Facility
How Green Roof Market Development is Like UBER??



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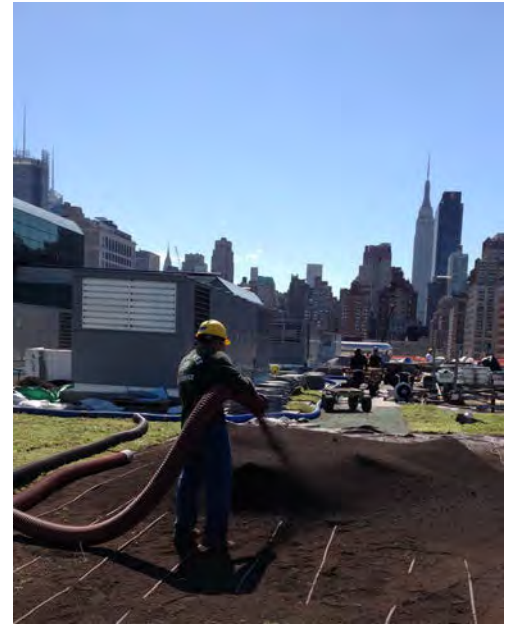
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ON THE COVER: Multi-Unit Green Roofs of the Riva Building, Portland, OR August 2012. Image by Brad Temkin who will be signing his new book entitled ROOFTOP at CitiesAlive in NEW YORK October 6, 1-2 pm, Trade Show Floor. Radius Books



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MISSION

Green Roofs for Healthy Cities' mission is to develop and
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nomic, social and environmental benefits of green roofs,
green walls, and other forms of living architecture through
education, advocacy, professional development and celebra-
tions of excellence.

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LIVING ARCHITECTURE OFFERS EMISSION REDUCTIONS AND PROMISE OF EMPOWERMENT IN NEW YORK

As I write this, uncontrolled forest fires rage across much of the West, forcing tens of thousands to flee their homes and firefighters from as far away as Australia come to help. The western drought not only burns crops, it turns forests into tinder boxes which threaten our communities. Our Residential Issue of this LAM is focused on the single family and multi-unit homes that make up these communities and both the challenges and opportunities of using living architecture to create beauty, save energy, improve our health and even provide a measure of protection from the growing impacts of climate change.

According to our four distinguished On The Roof With experts, smaller residential projects often bring with them the benefit of a fully engaged owner, one who understands the value of plants and the importance of ongoing maintenance of green roofs and walls. But these projects also bring challenges. Challenges associated with working on single family homes, such as relatively higher costs incurred with smaller projects in part because of the fixed costs inherent in their design and construction. Learn more about how specific biophilic design practices may make us healthier, both physically and financially as we continue to develop a comprehensive framework of benefits and metrics for living architecture – The Living Architecture Performance

Tool. Famed landscape architect Diana Balmori also shares with us some of her recent successes and thoughts on design practice and living architecture in New York and beyond.

This Fall we venture for the first time to New York City for the 13th Annual CitiesAlive Conference, Awards and Trade Show, October 5-8. We have planned an exceptional program from the Marriot Hotel in Brooklyn with lots of tours and networking to complement awesome technical sessions. New York is bursting at the seams with multi-unit residences, ranging from the plush and elegant skyscrapers in Battery Park City to run down and dilapidated buildings in the Bronx. Despite recent successes, considerable room remains for market development through improved policies, procedures and education. New York policy makers are largely focused on green house gas emission reductions, and green roofs and walls can save energy in a multitude of ways. Not only do they insulate roofs and walls, they can pre-cool the intake air on air conditioning systems, and provide outdoor cooling that helps to mitigate the urban heat island effect.

Join us and explore many amazing projects in the Big Apple this fall, and work towards a better vision of what New York can become– a place that at its core – is striving to provide a healthy living environment for all of its citizens under the lead-

ership of Mayor Bill de Blasio. In his One City: Built to Last plan, the plan for a low carbon, empowered city, de Blasio's administration describes in great detail how to aggressively reduce green house gases. Rising utility costs in New York, the report states, are posing a burden on low income tenants in the city, and through energy efficiency measures and better building systems the situation can be greatly improved. Saving energy has a social justice component built into it and future investments in retrofits promise new jobs.

The message we hope to convey at CitiesAlive is that green

roofs and walls provide many unrealized opportunities to help the Mayor and the citizens of New York meet their greenhouse gas targets, while also providing even more opportunities for an empowered and healthier society than what may be achieved by painting roofs white and installing new windows.

Sincerely,



Steven W. Peck, GRP
Founder & President, GRHC

LAM INDEX - "ONE CITY BUILT TO LAST" NEW YORK

Annual roof area targeted for white roof coatings:

1 MILLION SQ. FT.

Greenhouse gas emissions (GHG) reduction target:

80% below 2005 by 2050

Current level of GHG reductions:

19% from 2005

Source of more than 75% of New York's GHG emissions:

BUILDINGS

Residential buildings: 34%

Commercial and Industrial Buildings: 28%

Institutional Buildings: 8%

Number of City owned buildings: **4000**

MORE INFORMATION: <http://www.nyc.gov/html/builttolast/assets/downloads/pdf/OneCity.pdf>



LIVING ARCHITECTURE DOCTOR

Many green roofs and walls suffer from design and maintenance issues, creating an emerging market for diagnosis and treatment. The Living Architecture Doctor is a new feature that challenges you to figure out what went wrong and how to fix it. Test your skills—tell us what went wrong on this green roof? Diagnose the problem by emailing editor@greenroofs.org. Your response could be featured in the next issue of the *Living Architecture Monitor* magazine.

IN THE SUMMER ISSUE OF THE LIVING ARCHITECTURE MONITOR, WE ASKED YOU TO DIAGNOSE THIS FAILING GREEN ROOF.



YOUR TREATMENTS:

“I think there could be some sub-surface drainage issues such as a chokeage in the water reservoir layer in the middle of the planter bed, hence the clumping of the plants along the edges with the middle of the planter bed being comparatively more bare. Either that or the installer thought that they’ll just plant along the edges and over time the plants will propagate by themselves and grow towards the middle of the bed.”

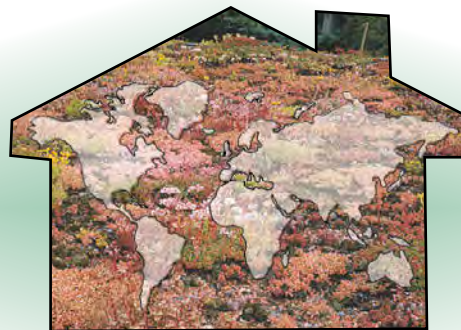
Yang Ling

“Looks like the roof was planted with cuttings during a season when they needed irrigation and they didn’t get it.”

Mehr Pastakia

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JOURNAL

OF LIVING ARCHITECTURE - VOL. I, ISSUE I

The Journal of Living Architecture (JOLA) is the official, peer-reviewed journal of Green Roofs for Healthy Cities.

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 publishes the abstracts of each published JOLA manuscript, with a link to the full paper online.

FEATURE

Arthropod habitat of green façades in the humid temperate climate of eastern North America, D.R. Tilley

Assessment of arthropod abundance and diversity of 10 green façades in the humid, temperate climate of eastern North America during 2011 found 4407 arthropods representing 18 taxonomic orders on the green façades while only 50 arthropods representing 7 orders were found on nearby bare walls. Green façades contained higher arthropod richness and diversity than bare walls. Abundance was related to vine area, canopy structural complexity and habitat availability within 200 meters of the facades. Arthropod richness was related to canopy thickness and structural complexity of adjacent landscaping. Green facades support healthy arthropod communities suggesting a unique role for supporting urban wildlife.

RESEARCH IN BRIEF

Green Roof Plant Trials for the Central Great Plains, R. Sutton

Forty-three taxa representing native and adaptable plants were trialed for 4 years on an irrigated (as needed) 15 cm (6 inch) deep extensive green roof in Lincoln, NE. Twenty-three of the taxa showed good performance with minimal maintenance. At the end of the trial in fall 2014, 32 of the taxa still had at least one specimen surviving. Drought impacts in the trial's second year eliminated several taxa. Four taxa, *Festuca cinerea*, *Carex glauca*, *Eragrostis trichodes*, and *Distichlis spicata*, performed well and have not been reported for extensive green roofs.

Change in Leaf Canopy of Two-Year Old Green Facades, R. Sutton

We demonstrate that diverse vine canopies of green facades, growing on steel trellis systems in eastern North America, developed leaf area indices (LAI) equal to 75% of their 2-yr maximum (3.9) and covered 80% of the wall surface within their first year. Green facades consisted of six native vine species and three grape (*Vitis*) species growing on various sides of two cubic wooden buildings (5.8 m², 2.4 m tall) in central Maryland. Diverse mixtures of vines appear to achieve dense canopies on steel trellis systems, which should promote their ability to deliver ecosystem services.

Read the entire papers here: <http://goo.gl/o1bk54>



Source: Monica Kuhn

LIVING ARCHITECTURE AND THE JOYS AND CHALLENGES OF RESIDENTIAL PROJECTS

FOUR EXPERTS REFLECT UPON THIS HUGE, RELATIVELY UNTAPPED MARKET.

For this residential issue of the LAM, we asked four prominent designers to share their thoughts about working on single family residential living architecture projects and any advice they'd like to share. On the roof with... Paul Kephart, GRP, President, Rana Creek Living Architecture, California; Kerry Ross, B.Arch, GRP, Alberta; Monica Kuhn, B.ES, B. Arch, GRP, Architect, Ontario; and Patrick Carey, hadj design, GRP, Illinois.

Paul - Home owners are interested in a wide array of opportunities for building green and have so many strategies to choose from, that green roofs and living walls are usually not considered “need to have” assets, they are “want to have” features. Home owners want to save money, improve aesthetics, and make sound investment in what for many is their primary asset. Here in California, renewable energy production and storm water harvesting are most often applied. Grey water, living roofs, and walls systems are usually considered last because of cost, perceived complexity, and maintenance.

Monica – Designing green roofs for single family residences has its joys and its challenges – often generated by the same circumstance. The spaces available

are usually small, which allows the designer to concentrate on the details, but also means that there are no cost benefits to be gained from purchasing systems and products in bulk. Clients have a vested, personal interest in the outcome, and the impact on their home, which makes the design process very satisfying - but those same clients may also not have the budget to do the design justice – especially if the green roof is being proposed on top of an existing structure which was never designed to accommodate the additional weight. As well, the municipal requirements for green roof permits and grant applications in Toronto seem to be set up for bigger projects, and things like structural engineering for wind uplift and loading, that are often daunting for a smaller project.

THE EXPERTS



Patrick Carey is the principal of hadj design now based in Chicago Illionois.



Paul Kephart is the president of Rana Creek Living Architecture located in Carmel, California.



Monica E. Kuhn , Architect Inc. is a small architectural practice in downtown Toronto specializing in residential and green roof design.



Kerry Ross, Architect, is the principle of greentdesign which focuses on sustainable home design in Calgary, Alberta.

Patrick - If you could imagine the environmental benefit of large housing developments with multi-functional green roofs and surrounding landscapes!! Food production, habitat support, cooling and heating energy savings, in other words all the benefits achievable with commercial green roof construction multiplied by 5 to 7 times! But then there is the factor of cost. Clearly green roofs cost more than alternatives. Their payback is also less obvious. A roof life that is 2 – 3 times longer, less heating cost, less cooling cost. Another challenge is that the single-family residence is small and owned by a single party. This spells low profits for those designing, installing, and maintaining them. It also means lower prestige for designers who usually work in the commercial/institutional field.

Kerry - Costs continue to be higher here in Alberta, compared to other regions, often making green roofs out of reach of smaller residential projects. While many green roof product suppliers now serve the province, much of the material is shipped in from distant locations. Also, there are few qualified contractors with green roof experience that serve single-family residential projects. Roof access and hoisting can often be problematic and expensive on residential projects. Ensure safe and adequate clearance of equipment from power lines as



well as narrow side yards which often results in manual transfer of material to the roof, hence more labour.

Paul - Some homeowners we work with have a deeper appreciation of the values of landscaping and plants. These homeowners are typically well read on sustainable topics and understand the benefits and site performance attributes living roofs and walls provide. And for many, they have a true appreciation for creative design and beautiful plants. Consequently, many residential clients we work with want to be engaged in the process of greening their homes. We are designing a 1,200 sq. ft. living wall for a family home in Carmel California. We designed the armature, irrigation system, and growing media. The family is very excited to participate in the composition, layout, and planting of the wall. They wanted to select some of the plants including herbs and some edibles. They approach their wall project as educational, fun, and creative. As designers we

get a lot of joy seeing people so engaged and excited in greening their homes. Overall residential projects are more successful when the owners are engaged and invested in the projects. By being interested in the design and construction they get a better understanding of the maintenance required and costs of installation. Long term maintenance and costs in addition to setting the right expectations, are areas you should especially focus on when we start the design process with owners representatives and owners.

Monica - My advice for the green roof professional is to carefully assess whether the green roof is reasonable for a specific client and location. If they already have a big garden, and the house is an old Victorian that would have to be structurally updated to support the green roof, impacting spaces inside that the clients were not contemplating on renovating, and the proposed location of the green roof cannot even be seen from the inside or outside of the house – much less easily accessed,

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then it might not be the best fit. Then if the decision is to go ahead, the green roof professional must be upfront – from the very beginning – about the process, the impacts, the approvals, the costs, and the ongoing maintenance that will be required to design, implement, and care for the green roof. Although you may lose some potential projects, your clients will thank you in the end – and the projects that do go ahead will have clients that are educated and enthusiastic, which generally results in a successful outcome.

Patrick – If you are a GRP and want to get involved in residential construction use your GRP knowledge to locate nurseries, growing media mixers, and roofers who are skilled at single ply membrane or cold fluid applied membrane work. Also find a structural engineer who is sympathetic to your cause. Find any green roofs in your area and

learn as much as you can about them, who did them, how much they cost, what were the stories behind the projects. Get a list of people who know more than you do about any aspect of green roofing and contact them, asking if they would be willing to advise you on future projects. If there are any people doing green roofs in your area, get on their crews! Do a few small scale green roofs on your own, chicken coops, backyard storage sheds, dog houses. Now for the hustle! Start public information talks, libraries, brown bag lunches at small construction outfits. GRPs have access to a standard powerpoint presentation you can use. Put together a theoretical residential project and run it by your “advisory staff.” Structure? cost? Time to complete? List of materials – being excruciatingly specific? Then, keep it up. If, in the future, you run into a large firm who is doing

green roofs, your field experience will be a highly valued asset. You learn about plants from the plant themselves. You learn about waterproofing from installing it. You learn about growth media from mixing and installing it. You learn about the other details from envisioning the project as a whole and personally installing the detailed elements. By the time you get to your tenth project you will have a foundation you can build on. Try not to replicate projects since you will learn more from variety. And lastly, read.

Kerry – Where possible, try to plan enough lead time to obtain better pricing of materials. For example, the contract growing of plant material can ensure the delivery of the desired plant palette, prevent wasted time and costs associated with sourcing alternate plants at the last minute and can often be the most economical choice. When building the

green roof, consider how the roof will be maintained either by your team or by others to ensure ease and safety of those maintaining. The easier it is to safely access the green roof, the greater the chance that the roof will receive the attention it requires. Ensure that planting design and species selection match both the climatic conditions and the maintenance plan; that is, if the budget for maintenance is low, avoid highly designed ornamental designs which can be costly to establish and maintain due to the high level of inputs (labor, water, amendments). Take particular note of the level of precipitation and if need be, select drought-tolerant plant species, I look at low-cost ways to incorporate supplemental watering; for some projects, a simple hose bib at roof level, timer and soaker hose provides additional moisture when required.

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Event sponsored by: Rooflite.



AWARDS OF EXCELLENCE

Each year we recognize integrated design and installation excellence with the Green Roof & Wall Awards of Excellence. This year there are nine design award categories for outstanding green roof and wall projects in North America.

Event sponsored by: Sika Sarnafil.



BUSINESS DEVELOPMENT CRUISE

After a full day of programming on Tuesday October 6, 300 attendees will board the Private Yacht Zephyr, pictured above at 7:30 and sail for 2 hours around the New York harbor with food, drink and entertainment. Only \$69 per person.

Event sponsored by: New York Green Roofs & Pernaloc.

AGENDA AT A GLANCE

Almost all *CitiesAlive* programming takes place at the New York Marriott at the Brooklyn Bridge.

SUNDAY OCTOBER 4

8:30 am – 5:00 pm Net Zero Water Boot Camp (Day 1)

MONDAY OCTOBER 5

8:30 am – 5:00 pm Net Zero Water Boot Camp (Day 2)

8:30 am – 5:00 pm Green Roof Design and Installation

8:30 am – 12:30 pm Introduction to Rooftop Urban Agriculture

10:00 am – 12:00 pm Green Roof Professional Exam

1:00 pm – 4:00 pm Living Architecture Performance Tool (LAPT) Workshop

1:00 pm – 5:00 pm Advanced Green Roof Maintenance

1:00 pm – 5:00 pm Green Walls 101: Systems Overview and Design

5:30 pm – 7:00 pm Opening Plenary & Keynotes

7:00 pm – 9:00 pm Trade Show Floor

TUESDAY OCTOBER 6

8:00 am – 8:30 pm Coffee & Continental Breakfast

8:30 am – 10:15 am Morning Plenary & Keynotes

10:15 am – 10:30 am Break

10:30 am – 12:00 pm Concurrent Technical Sessions #1*

12:00 pm – 2:00 pm Lunch on Trade Show Floor

12:00 pm – 2:00 pm Poster Sessions

1:00 pm – 2:00 pm Trade Show Product Presentations

2:00 pm – 3:30 pm Concurrent Technical Sessions #2*

3:30 pm – 5:15 pm Concurrent Technical Sessions #3*

5:15 pm – 7:00 pm Reception on Trade Show Floor

5:15 pm – 6:30 pm Trade Show Product Presentations

7:30 pm – 10:30 pm LHC Reception - Networking and Business Development Cruise

WEDNESDAY OCTOBER 7

8:00 am – 8:30 pm Coffee & Continental Breakfast

8:30 am – 10:30 am Concurrent Technical Sessions #4*

10:30 am – 10:45 am Break

10:45 am – 12:45 pm Concurrent Technical Sessions #5*

12:45 pm – 1:00 pm Break

1:00 pm – 2:45 pm Awards of Excellence Luncheon and Closing Plenary

2:45 pm – 5:15 pm Tours (Day 1)

6:00 pm – 8:30 pm Brooklyn Grange Dinner

THURSDAY OCTOBER 8

8:30 am – 5:15 pm Tours (Day 2)

9:30 am – 5:30 pm Harlem Green Infrastructure Design Charrette

* Concurrent Technical Sessions feature a Design, Policy, Research, and 'On the Roof With' panel discussion track.

Note: Agenda is subject to change without notice.

FOR RESILIENT PEOPLE, COMMUNITIES AND PLACES

Having toured around North America for more than a decade, the CitiesAlive Green Roof and Wall Conference is about to arrive in New York City.

At *CitiesAlive*, as many as 1,000 designers, researchers, policy makers and industry representatives will be descending on New York from October 5-8th, 2015 to join with hundreds of local and regional design, research, policy and construction professionals who are working in the growing market for green roofs and walls.



2014 Awards of Excellence Winner: New York Green Roofs - Midtown High Rise Green Roof, New York, NY.

SPEAKER HIGHLIGHTS

DOWNLOAD THE DETAILED AGENDA AT WWW.CITIESALIVE.ORG



BIOPHILIC SCIENCE & HOW LIVING ARCHITECTURE CONTRIBUTES TO PRODUCTIVITY, HEALTH AND HAPPINESS

KEYNOTE SPEAKER: BILL BROWNING, FOUNDING PARTNER, TERRAPIN BRIGHT GREEN



NEW YORK CITY: WORKING TOWARDS RESILIENT PEOPLE, COMMUNITIES AND PLACES IN THE FACE OF CLIMATE CHANGE

KEYNOTE SPEAKER: MARGARET CASTILLO, CHIEF ARCHITECT, NYC DEPARTMENT OF DESIGN & CONSTRUCTION



PAUL KEPHART, PRESIDENT, CEO, PRINCIPAL ECOLOGIST + DESIGNER, RANA CREEK LIVING ARCHITECTURE
THE CROTON WATER FILTRATION PLANT PROJECT



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DESIGNING FOR HEALTHY COMMUNITIES PANEL DISCUSSION



DR. CYNTHIA ROSENZWEIG, SENIOR RESEARCHER, NASA GODDARD INSTITUTE FOR SPACE STUDIES
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PROGRAM HIGHLIGHTS

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CONFESSIONS OF A GREEN DESIGNER

DIANA BALMORI DISCUSSES SCALING UP LIVING ARCHITECTURE,
THE RESILIENCY OF NEW YORK AND MORE.

INTERVIEW BY JEN BROADBENT



I caught up with Diana Balmori, FASLA, and founding principal of urban and landscape design studio Balmori Associates in New York, recent winner of an international competition for the master plan of the new city of Sejong, South Korea to ask her to share her views on emerging design trends...

JB: YOUR 'LANDSCAPE MANIFESTO' TALKS ABOUT HOW WE NEED TO REALIGN OUR CONNECTIONS WITH NATURE WHEN LIVING IN LARGE CITIES - WHAT ARE SOME EXAMPLES OF THIS IN YOUR WORK?

DB: A very direct example is the Botanic Research Institute in Texas (BRIT). Point Nine from my landscape manifesto is that new landscape elements can become niches for species forced out of their original environment. Nowadays, the Fort Worth Prairie [ecosystem] is practically non-existent. Within this ecosystem, there is a particular formation called the Barrens. We decided to make the green roof at the BRIT the Barrens, make the roof part of the Fort Worth Prairie. It's a way of giving another place for that formation to occur.

We tried different plant mixes and soil mixes gathered

from the Barrens, with different green roof systems, to see what was needed to work. We found a nice mix and created the BRIT to have a niche space for Barrens species on its roof.

Another example is our approach to river edges, allowing the river banks to accept the variations in water levels, subsuming some areas at their highest and uncovering them at their lowest ebb. This is the case of the treatment of the edge of the linear park by the river in Bilbao (Spain) and of the public platforms in Memphis at the foot of Beale Street that can withstand flooding from the Mississippi.

THE NEW GOVERNMENT ADMINISTRATIVE COMPLEX IN SEJONG, SOUTH KOREA, INCLUDES 68 ACRES OF GREEN ROOFS AND CONNECTING WALKWAYS. HOW DID YOU



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CONCEIVE THIS PROJECT ON SUCH A LARGE SCALE?

DB: We had the opportunity in Sejong to think of it as a new city. So we proposed a new approach to city-making, one that starts with landscape architecture, where a colossal park is built into the city. The superstructure has the [government buildings] tucked into it, and then on the seventh level there is a continuous park in the air, totally woven into the architecture. These are the kinds of dimensions that you can use when designing a city. We won the international competition for the design; one of the jurors told me afterwards that ours 'was the only new idea in the whole bunch'.

The aim for me is to blow out the dimension. 'We have a little building and we're going to put a little green roof on top' – that's fine. But for me it's the idea of bringing it to another scale. To find ways in which nature can reach this other dimension, create a whole dimension in green. Immersing the city in nature, letting nature come through. On another scale, it's revolutionary.

JB: WHAT ARE SOME OTHER INNOVATIVE METHODS YOU HAVE SEEN THAT INCORPORATE NATURE INTO CITIES AND INFRASTRUCTURE?

DB: New technology is present in nearly everything we do: green roof planting sub layers, bioswale systems, heliostats, drip irrigation, porous pavement. In Bilbao at the Campa de los Ingleses Park, we developed a concrete paver that contains an additive made entirely from industrial waste which absorbs CO2.

JB: WHAT NEW MATERIALS DO YOU THINK WE WILL BE USING IN THE FUTURE?

DB: Materials today are being transformed by having new technology applied to them, giving rise to many different versions. For the floating landscape we're building in the Gowanus Canal in Brooklyn we're experimenting with a buoyant material made of agricultural waste and the mycelium of mushrooms developed by Ecovative.

JB: HOBOKEN, NEW JERSEY, HAS RECENTLY BEEN NOMINATED BY THE UN AS A MODEL CITY FOR ITS WATER MANAGE-

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MENT AND FLOOD DEFENSE STRATEGIES. WHAT WAS MOST CHALLENGING ABOUT THIS BRIEF FOR YOU?

DB: Organized by the Hurricane Sandy Rebuilding Task Force and HUD, Rebuild by Design was a multistage regional design competition aimed at developing innovative projects to protect and enhance Sandy-affected communities. Our proposal 'Resist, Delay, Store, Discharge' was awarded the \$230 million design brief.

There were two main challenges: Firstly, the choice of the right site and the right size of the site to work with resiliency. We chose Hoboken because we felt it was the right size and site. Secondly, the total disconnect between the design competition and the "real" construction phase that now follows.

JB: WHAT ASPECTS OF THE HOBOKEN MODEL ARE MOST IMPORTANT FOR OTHER CITIES TO ADOPT OR CONSIDER?

DB: The integration of multiple resiliency systems -- hydrology, hard engineering, soft green engineering, architecture and guidelines for city policy -- and the size of the site on which to apply them.

JB: AFTER GROWING UP IN ARGENTINA, YOU HAVE LIVED IN NEW YORK NOW FOR MANY YEARS - WHAT IS IT ABOUT THE CITY THAT INSPIRES YOU? DO YOU THINK THE CITY IS RESILIENT ENOUGH FOR FUTURE CHALLENGES?

DB: Cities are the place to live in the 21st century. They are the most connected of places and where life is full of creative encounters.

But for the moment, like most cities, New York is not resilient

enough. It needs to have us all act in unison and with conviction to accept the evidence of climate change and do something about it. It takes a change in ways of thinking about the rest of the world: to treat rivers, oceans, mountains, plants, insects, birds, mammals, as friends and companions in our planet. We need to change the prior relationship we had with them.

Projects in New York are being done one by one. It's not a change of scale. It's a change of scale that matters, that's the next step. That's why I'm so satisfied with Sejong: it shows that the idea of green roofs and incorporating nature into a city has legs, and that it can work in another dimension.

JB: YOU HAVE EXTENSIVE EXPERIENCE WORLDWIDE, PARTICULARLY IN SPAIN, KOREA AND CHINA AS WELL

AS ACROSS NORTH AMERICA - IS THERE ANY REGION OR CITY THAT IS PARTICULARLY COMMITTED TO GREEN ARCHITECTURE AND RESILIENT DESIGN?

DB: In every place you find that attention is given to some aspect of resilient design, for example water recycling or forest maintenance, but nowhere is this all integrated to make up an overall system.

Green roofs are a way to create a different dynamic with buildings. Elements of the landscape and nature are in the city but they're never recognized as such. We have sunshine in the city, we have rain in the city, we can grow plants in the city. What it takes is making nature as part of the city, not as something that is imported or that is an exception. Nature is everywhere, and what we have to do is make it visible.

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PROJECT: MILL VALLEY HILLSIDE
ROOF SIZE: 5,500 SQUARE FOOT GREEN ROOF
LOCATION: MILL VALLEY, CALIFORNIA
AWARD: 2010 EXTENSIVE RESIDENTIAL AWARD
WINNER: MCGLASHAN ARCHITECTURE



PROJECT: ASA FLATS + LOFTS
ROOF SIZE: 5,410 SQUARE FOOT GREEN ROOF
LOCATION: PORTLAND, OR
AWARD: 2010 INTENSIVE RESIDENTIAL AWARD
WINNER: GGLO, LLC



PROJECT: THE ROYAL YORK CONDOMINIUM
ROOF SIZE: 14,000 SQUARE FOOT GREEN ROOF
LOCATION: NEW YORK, NY
AWARD: 2012 EXTENSIVE RESIDENTIAL AWARD
WINNER: TOWN AND GARDENS, LTD



PROJECT: SILVER CITY TOWNHOMES
ROOF SIZE: 11,575 SQUARE FOOT GREEN ROOF
LOCATION: MILWAUKEE, WI
AWARD: 2014 EXTENSIVE RESIDENTIAL AWARD
WINNER: XEROFLOR AMERICA



PROJECT: THE LOUISA
ROOF SIZE: 8,071 SQUARE FOOT GREEN ROOF
LOCATION: PORTLAND, OR
AWARD: 2007 INTENSIVE RESIDENTIAL AWARD
WINNER: WALKER MACY LANDSCAPE ARCHITECTS



PROJECT: VISIONAIRE GREEN ROOF
ROOF SIZE: 2,075 SQUARE FOOT GREEN ROOF
LOCATION: NEW YORK, NY
AWARD: 2013 EXTENSIVE RESIDENTIAL AWARD
WINNER: MARK K. MORRISON LANDSCAPE ARCHITECTURE



PROJECT: 36 OLIVE STREET
ROOF SIZE: 1,300 SQUARE FOOT GREEN ROOF
LOCATION: WINCHESTER, MA
AWARD: 2013 SPECIAL RECOGNITION AWARD
WINNER: RECOVER GREEN ROOFS, LLC



PROJECT: KIMBALL AVE. GREEN ROOF
ROOF SIZE: 700 SQUARE FOOT GREEN ROOF
LOCATION: CHICAGO, IL
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WINNER: OMNI ECOSYSTEMS

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MANY RESIDENTIAL ROOFS OPT FOR FOOD PRODUCTION

BY: MARGUERITE WELLS

Prior to the 70's Icelandic Sod Roofs were used as waterproofing, thermal regulation and security from the elements. Modern systems intended for the growth of vegetation on roof tops originated in Germany as a decorative means to embellish houses. Today, modern German standards are the benchmark to improve the conditions of urban environments and habitations, balancing the energy levels, as waterproof materials and to regulate the drainage and irrigation systems. The modern

green roof is better known for its application on industrial, commercial and educational buildings at larger scale. There are many reasons including extended cost and the economy of scale that prevent the market of smaller scale installations.

Smaller green roofs could be deemed a novel or hobbyist attempt at a shed, dog house and even a mailbox. The scale between novel and commercial may range from a few hundred up to two thousand square feet. The industry is proving the economy of scale on larger



PENDING ROOF LOAD CAPABILITIES DEEPER ROOTED PERENNIALS CAN BE INTEGRATED AS PART OF THE LOW MAINTENANCE PLANT PALLET.

THE INDUSTRY IS PROVING THE ECONOMY OF SCALE ON LARGER PROJECTS AS THE RESIDENTIAL MARKET LAGS SIMPLY DUE TO COST.

projects as the residential market lags simply due to cost. It is difficult to provide a cost per square foot that is not three or four times the cost of a larger project simply because no matter how big or small the project the costs of many of the services

and requirements for a green roof are the same. For example, the single most critical factor is the roof's ability to sustain the additional load of the green roof. If the roof load is not validated by an engineer or architect, then there is no reason



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WITH WIDESPREAD CONCERNS ABOUT THE QUALITY AND QUANTITY OF FOOD CITY-DWELLERS CAN OBTAIN, MORE AND MORE ATTENTION IS TURNING TO URBAN AGRICULTURE.

to go any further in the design process. Secondly there needs to be a high quality waterproofing and pending the roof line and slope, a residential project may require the removal of shingles and their replacement with a more suitable waterproofing option.

Assuming the initial criteria can be met or planned for during the construction process a green roof provides a myriad of benefits from economics to enhanced beauty. Without describing the details of economic benefits like extending the waterproofing life and savings on energy, the primary non-tangible benefits of a “roof garden” are that it provides amenity space and improved views.

With widespread concerns about the quality and quantity of food city-dwellers can obtain, more and more attention is turning to urban agriculture. Like in rooftop gardens, the edible component can be blended

in harmoniously with existing rooftop landscapes or as a rooftop farm. Pending the crops, a few simple changes need to be addressed: additional weight loading to the roof to accommodate heavier organic-based media, and access to the roof, since edibles require much higher maintenance.

The smaller green living roof projects are growing to accommodate a larger population. The pre-construction will always remain the same, roof load and quality waterproofing are non-negotiable. The design intent for the green living roof can be part of an overall concept in sync to biophilic design where nature is part of everyday life. No matter decorative, food production or amenity space a green roof is a tangible link between environment and economics.

Marguerite Wells is the president of Motherplants



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Keynote Building, Calgary, AB. Photo by Kerry Ross.

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A GREEN ROOF AND WALL RESEARCHERS BUFFET

THE ONGOING EVOLUTION OF A GREEN ROOF AND WALL
LABORATORY ON THE NEW YORK PARKS DEPARTMENT'S
FIVE BOROUGH COMPLEX ON RANDALL'S ISLAND

BY STEVEN PECK AND MAX LERNER



Artie Rollins (immediate left) is one of the reasons that a mega city like New York works. He is confident, practical and determined to do what's best for his City and the NYC Parks Department at large. Since 2007, Artie, the Assistant Commissioner of City-wide Services, has been using the 30,000 square foot green roof of the NYC Park's Five Borough Citywide Operations and Technical Services Building to grow and test a wide variety of green roof and green wall systems.



“Our first green roof system used 12 inches of Gaia soil, a product manufactured in New York” said Artie, “We installed 800 square feet of it using native plants, and since 2010, Columbia University has been conducting research on insects and native plants on this and several other plots” he added. “Our first project took only half a day to construct, and since then we’ve steadily added different systems with different depths of growing media. Currently we have more than 30 unique green roof systems up here.”

The site is truly amazing to visit and a challenge to maintain. It is like a huge buffet of various green roofs, some filled with native plants, others used to grow food, while still others like Xero Flor’s vegetative mats sport a healthy mix of sedum species. There are loose laid systems, mats, Green Grids and Biotray modular systems, Watergrip brownies and Green pak bag systems all on display.

The Parks department has also installed twenty, 300 gallon storage tanks around the roof to collect stormwater runoff and

uses this excess rainwater for irrigation purposes. They have also been developing a ‘walkable’ green roof system designed to take foot traffic and are experimenting with a variety of their own customized growing media blends.

The unique research site has a weather station, drip and spray irrigation system, composter, solar panel/green roof combinations, 10 beehives, raised planters, parapet planters, various trellis systems, multiple food plots for evaluating the yield from different mixes of growing medium and a hydroponic tower garden. During our tour, Artie asked me what type of research could be added to the site and I suggested that he look at using the lower roof sections to conduct a comparison of the Sun Root solar panel energy production above a green roof, a reflective roof, and a black roof. We need better data on the benefits of combining green roofs and solar panels I explain. He was receptive to the idea and said that they should be able to take that on – no problem!

Over the summer they’re

attempting to ambitiously grow corn once again but in a deeper, nine inch growing media blend than in previous years to provide additional space for keeping the roots anchored. The previous corn blew over! A Tournesol Siteworks green wall system is doing very well after a hard winter and there are multiple green facades in place throughout the roof. Even the parapet walls are all covered with planters, both adding green space to the roof while additionally acting as a safety feature.

Employees regularly visit the roof and atrium to have their lunch and relax. Artie and his team are kept busy with tours each week, including many foreign delegations that come to see the wide variety of technologies. Artie’s primary goals appear to be focused on understanding the depth, weight and cost of different green roof systems that can handle the New York City climate.

What’s next Artie, we ask as we conclude our tour. “The Parks Department has more than 1 million square feet of roof space and were small compared

to many others, but I’d like to see most of this go green!” Seeing what he has accomplished in several short years, we wouldn’t be surprised to see this come to fruition.

The Five Borough Complex is incorporated into CitiesAlive agenda and tours.

Steven Peck is the founder and president of GRHC. Max Lerner is a Sustainability Analyst with Citywide Services Sustainability Division, New York Park’s Department.

FIND OUT MORE

<http://www.nycgovparks.org/greening/sustainable-parks/green-roofs>

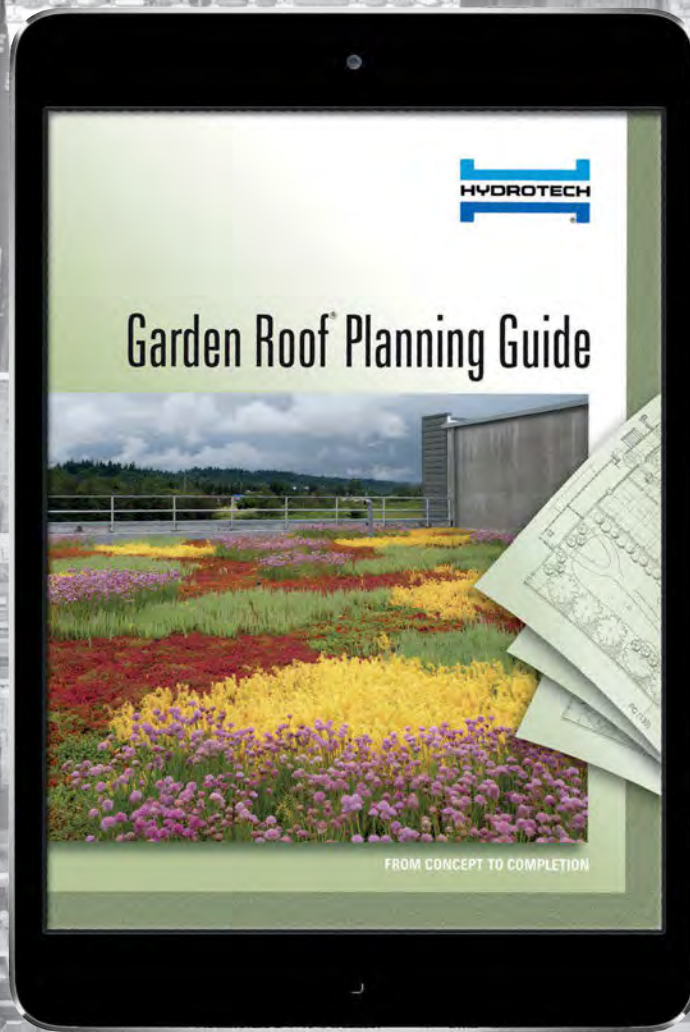
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INCREASING PROPERTY VALUE THROUGH BIOPHILIC DESIGN

HOW LIVING ARCHITECTURE CAN GENERATE A RETURN ON INVESTMENT.

BY ROHAN LILAUWALA

Biophilia is the innate connection that humans have with natural systems and processes. Humans likely formed this dependence on nature through the course of our evolution. We have spent the last two-hundred or more years increasingly separated from nature – some would even assume this is a measure of human progress. Yet science increasingly demonstrates that contact with nature is a necessity that underpins our physical and mental health.

After years of attempting to conquer nature, we now have the opportunity to use biophilic design principles to reconcile the built and natural environments and to turn cities and buildings from places that drain us to places that can actually restore our well being.

Over the past 30 years, hundreds of peer reviewed scientific research studies have demonstrated that there are a wide range of benefits that exposure to nature offers, including reduced stress levels, improved cognitive

LIVING ARCHITECTURE IS AN EXPRESSION OF BIOPHILIC DESIGN – IT BRINGS NATURE AND GREENERY TO FORGOTTEN AND UNDERUTILIZED SPACES LIKE ROOFS AND WALLS.

Roban Lilawala is a senior researcher at Green Roofs for Healthy Cities.

FIND OUT MORE

Read the Living Architecture Performance Tool – Biophilic Design White Paper. goo.gl/Sjqk6r

See Bill Browning's keynote address, 'Biophilic Science & How Living Architecture Contributes to Productivity, Health and Happiness' at CitiesAlive in New York, October 5-8, 2015. www.citiesalive.org

For references and photos, visit <http://goo.gl/OZFgOE>

Join the Living Architecture Workshop on October 5 at CitiesAlive.

performance in the workplace, reduced recovery time for patients, improved childhood development, and even reduced crime rates. There are even strong economic arguments to be made for biophilic design related to productivity, but perhaps the easiest one to make is that biophilic design increases property value.

A University of Pennsylvania study from 2004 suggests that trees planted at the front of a house raises property values by up to 9 per cent. Similarly, estimates from a report prepared for the Canada Mortgage and Housing Corporation in 2010 show that a view of a green roof or green wall could raise property values by 9 per cent, while a recreational rooftop garden can raise property values by 11 per cent. Most dramatically, a 1998 article in the Journal of Real Estate and Economics found that properties with a view of the Puget Sound had a 59 per cent premium, while lakefront properties in the area had a premium of 127 per cent!

While not every property

can be on a lakefront, there are still many ways to use biophilic design principles to increase property values. Living architecture is an expression of biophilic design – it brings nature and greenery to forgotten and underutilized spaces like roofs and walls. A few design strategies can help maximize the biophilic potential of living architecture. For example, locating it where it can be experienced by the maximum number of building occupants, using plants that move in the wind and flower, prioritizing biodiversity as a design goal. Incorporating visible and/or audible water features also increases health benefits. Green roofs and walls bring nature to buildings, making their occupants happier and healthier, and maximizing property value in the process.

Biophilic design principles are being built into the Living Architecture Performance Tool, which is designed to create a comprehensive framework of metrics and design principles that reflect the full range of benefits possible through living architecture.



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THE GREEN INFRASTRUCTURE DESIGN CHARRETTE PROJECT

ARTICULATING THE VALUE OF NATURE IN OUR COMMUNITIES.

BY: VINCENT JAVET



Current policy, planning, finance and development practices grossly undervalue the contribution that green infrastructure makes in our communities. This results in sub-optimal infrastructure investment, unnecessary expenditures on grey infrastructure, and communities that are far less healthy and sustainable than they could be. This pilot project begins a discussion at the neighbourhood level about a different development and redevelopment path.

This path recognizes and values the contribution that green infrastructure can make to address stormwater and urban heat island challenges, provide local employment and improve the health and sustainability of local communities. This project aims to inform a larger discussion about how best to allocate public funds in order to maximize our return on investment and prepare us for the negative impacts of climate change. The Green Infrastructure Design Charrette Pilot Project challenges us to think about green infrastructure investment in big picture terms, the way we think when we develop a new road, or build a new bridge, water treatment or power plant. What would you do if you had a billion dollars to spend on green infrastruc-

ture? What would the return on investment be?

The pilot project consisted of three major elements: holding several design charrettes, the review and customization of cost-benefit values for each type of green infrastructure, and producing a compelling final report. These three major elements helped engage multi-disciplinary experts and develop new interpersonal networks, create compelling plans for the application of innovative green infrastructure applications in their communities, generate an understanding of the potential costs and benefits that will result from realization through the development of economic analysis and pull together a vision of green infrastructure investment in a final report.

Through funding provided by the George Cedric Met-

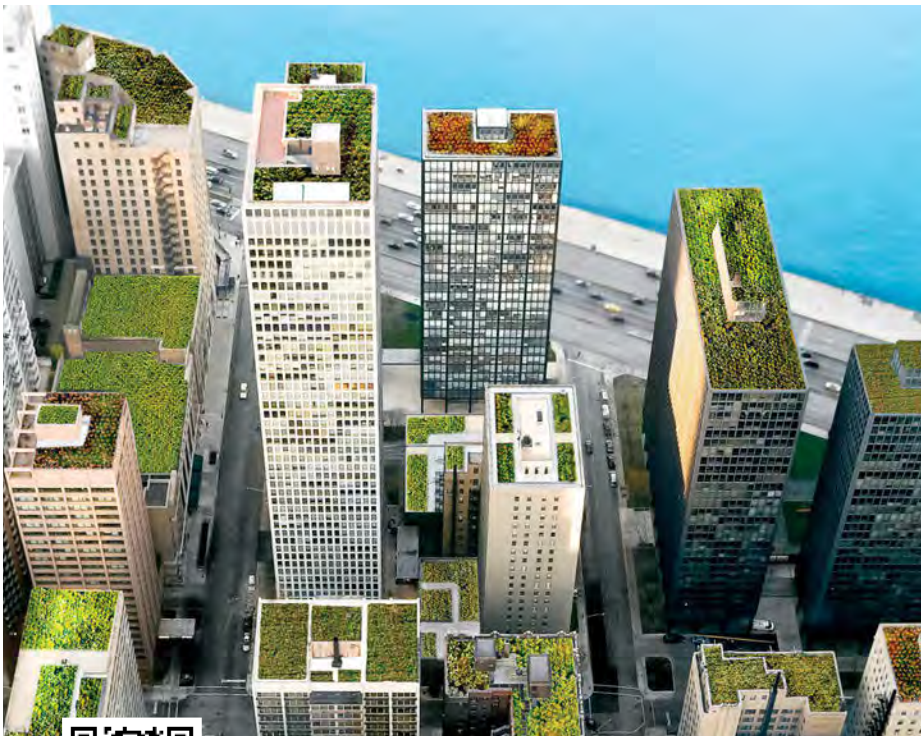
calf Charitable Foundation, Green Roofs for Healthy Cities, in partnership with Landscape Ontario Horticultural Trades Association and the Ontario Parks Association were able to embark on a research and community engagement initiative with six communities to redesign eleven sites throughout Ontario. Toronto, Vaughan, Brampton, Mississauga, Oshawa and London participated in the project.

In each city community leaders selected two to three sites that were derelict of green infrastructure. Each city provided a variety of site typologies including brownfields, greenfields, and existing urban built form, all of which required greater investment in green infrastructure. Background information on land use, types of buildings, utility corridors, and characteristics of

the community for each site was provided to designers. This information formed the basis of opportunities and constraints that defined what was needed and possible for the design of each site.

Design participants from different disciplines (planning, landscape architecture, architecture, and engineering) and community representatives participated in the one day charrette event. During the charrette, eight to twelve participants per site were guided by a facilitator through a process of identifying major opportunities and constraints associated with the site, and working towards a final design product to scale, on the maps and tracing paper provided. The discussions were lively, and many professionals left their 'silos' to engage in a healthy discussion about what was possible or not, and why.

THE PLANS INCORPORATE THE NOTION OF OPENING UP SPACES WITH A VIEW TO THE POND AND SOFTENING BUILDING EDGES THROUGH LANDFORM BUILDING.



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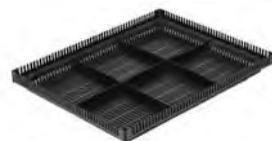
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Jane Welsh of the City of Toronto's City Planning division, who participated in the Toronto design charrette stated "In a general sense the take-away was a more in-depth understanding of the needs and concerns of the various participants and the roles they play, and the feasible ways these can be balanced through creative thinking and design." Jane went on to highlight the importance of articulating monetary benefits of green infrastructure, stating "The ideas generated and the understanding gained of the monetary value of the ecosystem services provided were carried forward and have influenced our work on these projects."

The first Green Infrastructure Design Charrette was held in Vaughan, Ontario. All three sites selected are found within the Vaughan Metropolitan Centre (VMC), designated as an Urban Growth Centre by the Provincial Growth Plan, and as a Regional Centre in the Region of York's Official Plan. The VMC is embedded in the heart of a major regional industrial area and transportation network. The site of the VMC is currently a combination of developed commercial property, light industrial development property, and undeveloped land. The

selected sites each interface with the Black Creek Stormwater Pond and Park and provide an interesting frontage with the Streetscape and Open Space Plan framework. Using this existing natural capital as inspiration and the backbone of the overall site design, charrette participants redesigned proposed site plans with intense living green infrastructure applications.

The plans aim to help ensure that the revitalized Black Creek becomes an integral part of the green public infrastructure within the VMC in its design concept and through the provision of design guidelines. The plans incorporate the notion of opening up spaces with a view to the pond and softening building edges through land-form building. The Edgeley Pond site redesign incorporated approximately 85,000 m² of new green infrastructure into the area, as well as 500 m² of agricultural focused green infrastructure uses. The capital investment is estimated at approximately \$7,600,000 with an estimated maintenance requirement of \$960,000. The 50 year public return on investment is an estimated \$17,300,000. The investment in significant green infrastructure should also improve significantly the saleability of

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Highview Creations is a New York City based Green Roof Design and Installation Firm whose goal is to couple natural systems and the urban environment to create a healthier New York. Based in Brooklyn, Highview Creations specializes in design, installation, and maintenance of green roofs in New York City. They work to develop customized green roof systems based on the specific needs of their clients. With projects across New York City, this small team of landscapers, designers, and planners work in each stage of a project, from design to installation to maintenance.

GREEN STUDIOS

greenstudios.net

Green Studios is a landscape architecture and technology platform, co-founded by an architect, a landscape architect, landscape engineer and an economist. Winner of the MIT enterprise forum of the Pan-Arab region competition for its innovation in the field of Green Walls and Roof Gardens (2011), winner of Lebanon best business of the year (2012) and selected Endeavor high impact entrepreneur (2014), Green Studios always tackles design and technology together within the thinking process and seeks to influence the field of landscape architecture with this innovative approach.

TRAINING COURSES

TWO LOCAL POLICY DEVELOPMENT EVENTS HELD

In its mission to advocate for new policy, GRHC hosted two local Market Development Symposia this year, in Pittsburgh, PA on June 19 and Louisville, KY on June 26. These one-day events featured experts and leaders presenting on green roofs and walls and the importance of strong policy implementation. GRHC is always looking for growing municipalities to campaign for green roof policy and is currently considering areas like Newark, NJ and Columbus, OH. If you want to suggest a city or help facilitate a Market Development Symposia, please contact Blaine Stand, Membership Coordinator at bstand@greenroofs.org or 416-971-4494 x223.

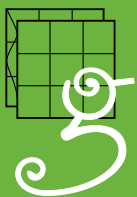
GNET ZERO WATER FOR BUILDINGS AND SITES TRAINING AVAILABLE ONLINE

Starting in October 2015, GRHC's Net Zero Water for Buildings and Sites training will be available as an interactive, 8-week online course. This is a unique opportunity to discover how buildings can supplant water supplied by energy-intensive municipal infrastructure and achieve self-sufficiency through a combination of rainfall harvesting, aggressive conservation, and water recycling. Tuition includes 15+ hours of lecture videos and a 350-page hard copy reference guide, as well as research reports, assignments, and supplementary materials. Register at www.greenroofs.org/education.

Thank you to Jeffrey L. Bruce, Ewing and Hunter Industries for sponsoring the development of this program.

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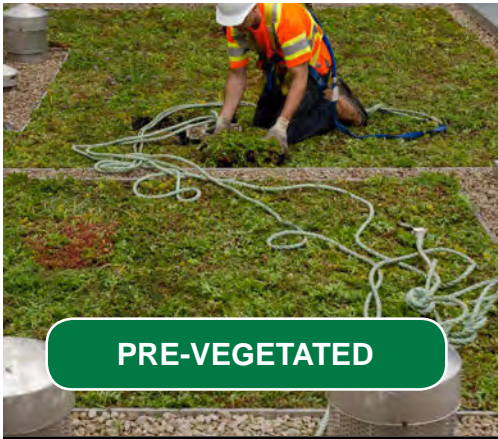
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GREEN ROOF MARKET DEVELOPMENT SHARES A LOT WITH UBER

BY OSCAR WARMERDAM

Why not use the hot steamy days of August to blow off some steam and rattle some of the cages of the green roof industry. People like Hamid Karimi from DDOE, Matt Barmore from Firestone, myself and a small number of others have tried to light a fire underneath our industry to focus our collective resources to do more to influence stormwater policy in favor of green roof solutions. Last year six industry members (Carlisle SynTec, Columbia Green Technologies, Firestone Building Products, Rooflite, Sempergreen, and Vegetal i.d.) participated financially and we got off to a good start with the development and creation of a 'single voice' green roof marketing materials that tell policy makers why they should consider green roofs, what do they do, and what secondary benefits they bring. Matt Barmore made a convincing case among our members as to why we need to work together as an industry and help one another to grow the pie, raise the sea level etc....you get the drill. Growing our industry requires more brand neutral awareness of decision makers of how specifically green roofs can solve stormwater problems.

What does a taxi company have in common with green roofs? A while back, while on vacation in June I read an article in an entrepreneurial magazine that inspired me to write this article. You probably have heard of Uber or a similar pink-moustached company called Lyft? They are two companies that provide 21st century car ride sharing services. I am a very loyal Uber user and I love the service. I need a ride and start my app, I post it on my iPhone, ask for and receive a quote, a driver commits and I receive live information about his/her name, the license plate and on the map I see the Uber car's progress as it approaches me in real time. Wow. On top of this, it saves me 30-40% compared to regular taxi's. So what is the point of all this?

What Lyft and Uber have been able to achieve despite aggressive fighting back from many taxi unions and gun shy city officials is nothing short of amazing. What an example they are for our industry!!

Services like Uber and Lyft are new technologies that were unheard of not too long ago. Their biggest hurdles are taxi unions and layers of bureaucracy. The benefits are great. Uber and Lyft alleviate a huge capacity concern around rush hour, or

when it rains. It lessens road congestion as people share rides to and from work. It allows people to have jobs with extremely flexible hours and have a small business of their own. I met a house-father that dropped his kids off at school, drove Uber all day, and by 4pm he picked up his kids to take them home. I met a guy that took me from the airport in Houston where he lived, and he drove me to downtown where he worked. (Yes, to be fair, the taxi drivers are hurt, but like Darwin says, if the taxi industry was offering something superior I would not have chosen an alternative. Ride sharing fills a need).

Veronica Juarez is the Director of Government Relations of Lyft. At first their car ride share services were not legal!. And unlike the green roof industry, Lyft was entering an array of hostile unions and local laws in order to get these new services approved in a city. They took that effort one city at the time. They needed to meet with government agencies and elected officials and explain what they were doing, explain the benefits and then help the policy makers to create new rules around that.

Grey Infrastructure is the status quo, the primary solution to past stormwater problems. Our green roof industry solves a storm water capacity issues we have unlimited scalability, and like Lyft we have many, many secondary benefits. But someone needs to bring these to the attention of policy makers. The companies that create massive underground infrastructures, structures that no one ever sees and have no aesthetic benefits, these builders are

meeting policy makers in their offices. You might say that web-based companies such as Lyft or Uber have access to much more capital and they can do greater things! But companies such as Uber or Lyft at one point were an idea before they were a company and they were tiny little companies and through persistence and perseverance and the purposeful CHANGE OF POLICY they became BIG. No, you can't compare them, because they had MUCH bigger adversaries than we do.

Their game is similar to ours. In every city, one by one, they need to identify the officials, explain the benefits to policy makers and assure them they are not replacing existing infrastructure, but instead they are building a dynamic carpooling network, one city at the time, one car at the time. We need to do the same, one city at the time, one green roof at the time. We need to make city officials aware that they too can build a dynamic green infrastructure network, with a primary component being a green roof in order to realize many additional benefits.

FIND OUT MORE

Free one hour webinar:
Best Practices in Green Roof

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Toronto, Devens and Washington DC <https://vimeo.com/99829551>

Oscar Warmerdam is the president of Moerings/Sempergreen and Chair of GRHC's Corporate Members Committee.



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