

12th Annual Green Roof & Wall Conference 2014

(CitiesAlive)

**Nashville, Tennessee, USA
12-15 November 2014**

ISBN: 978-1-5108-0119-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2014) by Green Roofs for Healthy Cities (GRHC)
All rights reserved.

Printed by Curran Associates, Inc. (2015)

For permission requests, please contact Green Roofs for Healthy Cities (GRHC)
at the address below.

Green Roofs for Healthy Cities (GRHC)
406 King Street East
Toronto, ON M5A 1L4
Canada

Phone: (416) 971-4494
Fax: (416) 971-9844

jrichie@greenroofs.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

1D: USING INFORMATION MODELING TO DESIGN SUSTAINABLE PROJECTS	1
<i>Eric Gilbey, Francois Levy, Stephen W. Schrader</i>	
1P: DEVELOPING SELF-SUFFICIENT WATER SUPPLY STRATEGIES: LOW IMPACT DEVELOPMENT AND GREEN INFRASTRUCTURE SOLUTIONS FOR PRIVATE AND PUBLIC CONSTRUCTION PROJECTS: GREEN INFRASTRUCTURE FOR URBAN WATERSHED MANAGEMENT	12
<i>Neal Shapiro</i>	
1R: WATER SUSTAINABILITY OF LIVING ARCHITECTURE IN A RESIDENTIAL HOME AND STORMWATER RUNOFF FROM A SLOPED GREEN ROOF: WATER BALANCE OF A SLOPED GREENROOF LOCATED IN THE MID-ATLANTIC REGION OF NORTH AMERICA	21
<i>Scott Tjaden, David Tilley</i>	
2D: ROOFING SYSTEMS – ROOF LEAK TESTING METHODS, OVERBURDEN APPLICATIONS AND MANAGING EXPECTATIONS: MANAGING EXPECTATIONS IN THE GREEN ROOF WORLD	29
<i>Richard C. Hayde</i>	
2R: EMPIRICAL RESEARCH ON GREEN ROOF THERMAL PERFORMANCE, STORMWATER MANAGEMENT AND BLACKWATER TREATMENT: INVESTING IN IRRIGATION TO MAXIMISE THE COOLING AND INSULATION BENEFITS OF THE PLANTS?	37
<i>Madalena Vaz Monteiro, Tijana Blanusa, Ross W. F. Cameron</i>	
2R: EMPIRICAL RESEARCH ON GREEN ROOF THERMAL PERFORMANCE, STORMWATER MANAGEMENT AND BLACKWATER TREATMENT: MEASURED WATER DETENTION PERFORMANCE OF ENHANCED GREEN ROOF TRAY SYSTEMS	43
<i>Graig Spolek, James H. Lenhart</i>	
2R: EMPIRICAL RESEARCH ON GREEN ROOF THERMAL PERFORMANCE, STORMWATER MANAGEMENT AND BLACKWATER TREATMENT: WORLD’S FIRST OPERATIONAL BLACK-WATER FILTERING LIGHTWEIGHT GREEN ROOF	55
<i>Joris G. W. F. Voeten</i>	
3D: DISCOVER NEW TECHNIQUES TO DESIGN PRODUCTIVE LANDSCAPES THAT FILTER THE AIR, CONSERVE WATER AND REDUCE MAINTENANCE: LEARN HOW TO USE ENERGY MODELLING AS A DESIGN TOOL: BUILDING ENVELOPE INSULATION - THE OVERALL EFFECT ON ENERGY MODELING PERFORMANCE	65
<i>Paul Todd Merrill</i>	
3D: DISCOVER NEW TECHNIQUES TO DESIGN PRODUCTIVE LANDSCAPES: WATER DYNAMIC URBAN LANDSCAPES: A CASE STUDY FOR MEC	74
<i>Randy Sharp</i>	
3P: LEARN HOW TO TAKE ADVANTAGE OF TAX INCENTIVES AND GRANT OPPORTUNITIES: THE "GREEN" IN BUILDING GREEN	85
<i>Theresa Samples</i>	
3R: PANEL DISCUSSION - WHAT GREEN ROOF AND WALL RESEARCH IS GOING ON AT NORTH AMERICAN UNIVERSITIES: EFFECT OF WATER BALANCE ON GREEN ROOF BENEFITS	93
<i>D. Bradley Rowe</i>	
4D: DESIGNING WITH BIODIVERSITY IN MIND: SPREADING THE GREEN ROOF BUG: GREEN ROOFS FOR BIODIVERSITY	107
<i>Jeremy Monsma, Erik Cronk</i>	
4D: DESIGNING WITH BIODIVERSITY AND ECOLOGY IN MIND: SUCCESS AND SUCCESSION	114
<i>Terry McGlade, Jenny Hill</i>	
NUTRIENT MANAGEMENT FOR SEDUM SPECIES AS GREEN ROOF PLANTS	125
<i>Youbin Zheng, Mary Jane Clark</i>	
4R1: NEW RESEARCH ON GREEN ROOF NUTRIENT MANAGEMENT: THE NEW KINETICS THAT ALLOWS MUSIC FROM WATER IMPROVES WATER QUALITY WITH GREEN INFRASTRUCTURE	136
<i>Brad Bass, Maya Burhanpurkar, Ryan Janzen, Steve Mann</i>	

4R1: NEW RESEARCH ON GREEN ROOF NUTRIENT MANAGEMENT: NORWEIGIAN KELP (ASCOPHYLLUM NODOSUM) CAN IMPROVE HEALTH AND DROUGHT TOLERANCE OF GREEN ROOF PLANTS	147
<i>Stephanie Appleby-Jones, Jeremy Lundholm</i>	
4R.2: MAKING THE BUSINESS CASE FOR GREEN ROOFS AND WATER USE CONSIDERATIONS: WATER, SALT ACCUMULATION AND NUTRIENT USAGE IN RECIRCULATING SYSTEMS	159
<i>A. Darlington</i>	
QUANTIFYING ENERGY USE REDUCTION, ECONOMIC BENEFITS AND NUTRIENT ABATEMENT FROM A GREEN ROOF SYSTEM	163
<i>Glenn Williamson, Stephen E. Macavoy</i>	
5D1: NEW PERFORMANCE METRICS FOR GREEN ROOF COMPONENT MATERIALS AND WATER BALANCE ANALYSES: NEW PERFORMANCE METRICS FOR GREEN ROOF COMPONENT MATERIALS	174
<i>Charles Miller</i>	
5D1: NEW PERFORMANCE METRICS FOR GREEN ROOF COMPONENTS AND WATER BALANCE ANALYSES: GREEN ROOF IRRIGATION: CONSIDERATIONS & CASE STUDIES	184
<i>Molly Meyer</i>	
SEMI-ARID GREEN ROOF RESEARCH 2009-2014: RESILIENCE OF NATIVE SPECIES	195
<i>Lee R. Skabelund, Carolyn Blocksome, Dede Brokesh, Hyung Jin Kim, Mary Knapp, Maryam Hamehkasi</i>	
5R: GREEN ROOF AND WALL PLANT SURVIVAL IN SEMI-ARID CLIMATE AND VOC REMOVAL BY LIVING WALL BIOFILTERS: PLANT SURVIVAL FOR LIVING WALLS IN A SUBTROPICAL CLIMATE	211
<i>Bruce Dvorak, Kirk Laminack, Astrid Volder, Don Conlee</i>	
SESSION 6 D1: GREEN ROOF AND WALL TRENDS IN N.A AND ASIA AND 8 YEAR LOW MAINTENANCE PERFORMANCE TRIALS: SUMMER HEAT, DROUGHT AND THE DISCOVERY PLACE GREEN ROOF TRIALS	222
<i>Charles R. Friedrich</i>	
AVIAN MONITORING ON PORTLAND ECOROOF	236
<i>Casey Cunningham</i>	
Author Index	